A SYSTEMATIC REVIEW OF THE EFFECTIVENSS OF PRENATAL EDUCATION CLASSES ON PSYCHOSOCIAL POSPARTUM OUTCOMES FOR MOTHERS

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Abstract

Pregnancy is a time of tremendous life change as women become mothers. In Canada, 65% of primiparous women attend prenatal education classes during pregnancy. The goals of prenatal education are to provide information and support for women during the perinatal period. It is important for registered nurses and other prenatal educators to understand the role prenatal education classes have on influencing psychosocial postpartum outcomes. This systematic review answers the question 'what is the effectiveness of structured prenatal education classes for mothers on maternal mental health, social support, transition to motherhood, infant care, and sexuality'. Inclusion criteria included studies published since 2003, a comparison study design, and a structured group prenatal education class for pregnant women which measured the outcomes of maternal mental health, social support, transition to motherhood, infant care, or sexuality between birth and 12-months postpartum. A search conducted April 2018 (updated July 2019) within the databases of CINAHL, MEDLINE, EMBASE, PsychINFO, Dissertations and Theses databases, found 10,047 studies with 15 included in the review. Relevance and validity tools were applied, and a data collection table organized the synthesis. The results of the review indicate prenatal education classes are of mixed effectiveness, with some benefits for: (a) maternal mental health sub-outcomes of depression, maternal well-being, confidence, and learned resourcefulness; (b) social support outcomes of support from others, perception of social support, and relationship satisfaction; and (c) the transition to motherhood outcomes of satisfaction with motherhood and with life, and self-efficacy. Prenatal education classes were not of benefit for infant care in the single study reporting on this outcome, and no studies reported on sexuality. A limitation of the review is the heterogeneity of the concepts under study, measuring tools, and content of the interventions, making it difficult to arrive at a firm conclusion. The review demonstrated prenatal education class interventions which include psychosocial topics and/or skill building elements and/or of longer duration show a greater benefit for some outcomes under study, although not for all. Prenatal education classes without additional psychosocial content generally do not demonstrate a benefit over nonattendance for these outcomes.

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Dedication

I dedicate this work to my parents, Judy and Lawrence Fletcher,
my first teachers and supporters, for without you I could not have completed this work,
and to my Aunt Lynne Lynch, my role model in nursing and nursing education,
who demonstrated you can be a nurse educator, a student, and a parent, simultaneously.

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List of Abbreviations

AHS	Alberta Health Services
CAPEA	Childbirth and Parenting Educators of Australia
CCS	Couple Communication Scale
CES-D	Center for Epidemiologic Studies for Depression
CSEI	Coopersmith Self-esteem Inventory
CSS	Couple Satisfaction Scale
CWS	Cambridge Worry Scale
EPDS	Edinburgh Postpartum Depression Screen
FFMQ	Five Facets of Mindfulness Questionnaire
GHQ	General Health Questionnaire
ICEA	International Childbirth Education Association
Interv.	Intervention
LGBTQ2S	Lesbian Gay Bisexual Transgender/Transsexual Queer Two Spirit
MAI	Maternal Attachment Inventory
mo	Months
MMH	Maternal Mental Health
NCC-WCH	National Collaborating Centre for Women's and Children's Health
NCT	National Childbirth Trust
NHS	National Health Service
PAM	Parenting Alliance Measure
PES	Postnatal Parent Expectations Survey
PHAC	Public Health Agency of Canada
PHQ-9	Patient Health Questionnaire
POMS	Profile of Mood States
PSEQ/PPSEQ	Prenatal/Postpartum Self-Evaluation Questionnaire
PPD	Postpartum Depression
PRQ-85	Personal Resources Questionnaire
PSOC-E	Parenting Sense of Competence-Efficacy Scale
PSS	Perceived Stress Scale
PSSS	Perceived Social Support Scale

PP	Postpartum Period
RCT	Randomized Controlled Trial
RS	Resilience Scale
SCS	Self Control Schedule
SHA	Saskatchewan Health Authority
SOS	Significant Others Scale
SPSQ	Swedish Parenthood Stress Scale
SS	Social Support
SWIRS	Satisfaction with Interpersonal Relationships Scale
TR	Transition to Motherhood
WDW	Who Does What/Who Will Do What
WHO	World Health Organization
WHOQOL-BREF	World Health Organization Quality of Life Scale
wks	Weeks
yr	Year

CHAPTER 1

1. INTRODUCTION

Prenatal education classes are a widely accepted method of educating new parents in high resource countries about birth and early parenthood. During pregnancy many women, with their partners, attend a series of classes to prepare for the life transition of birth and parenting. In Canada, the broad goal of prenatal education is to prepare women and their partners for pregnancy, birth, postpartum adjustment, and infant care (Public Health Agency of Canada (PHAC), 2009). Prenatal education classes are a longstanding intervention that have become a cultural expectation for pregnant women as part of the transition to motherhood (Ahldén, Ahlehagen, Dahlgren, & Josefsson, 2012; Koehn, 2008). This transition begins in pregnancy and continues well into the postpartum period with the transition to motherhood aided by successful completion of the tasks of pregnancy (Mercer, 2004). Prenatal education classes are commonly viewed as one such task of pregnancy (Koehn, 2008).

1.1 History of Prenatal Education Classes

Prenatal education has evolved significantly over the last one hundred years. The earliest form of formal prenatal education began in America in the early 20th century as a public health measure to encourage hygiene and reduce infection, with the goal of improving the health of women and infants (Polomeno, 2009). Through the 1940's-1960's childbirth routinely involved medicated amnesic birth (Haire, 1999). In response, several proponents of natural childbirth, such as Lamaze, Dick-Read, Montague, and Bradley, wrote books on childbirth and the International Childbirth Education Association (ICEA) was formed (Haire, 1999). Prenatal education classes, as we know them today, were first introduced to North America to promote natural unmedicated birth (Haire, 1999; Lothian, 2008; Polomeno, 2009). Prenatal education quickly grew throughout Canada, the United States, Europe, Australia, and South Africa during the 1950's (Polomeno, 2009). Gradually hospitals also took on an educational role, often promoting the medicalized practices favored by the institution and increasingly medicalized childbirth knowledge was incorporated into classes (Haire, 1999; Lothian, 2008). Prenatal education evolved further to include information on early parenting (Polomeno, 2009). Today prenatal education has further

developed to provide education to the general population of parenting couples, as well as to specific population groups (Best Start by Health Nexus, 2019).

1.2 International View of Prenatal Education Classes

1.2.1 Canada

In Canada, prenatal education classes typically include information on pregnancy, preparing for birth in a hospital, labour pain management, newborn care, and adjustment to family life (PHAC, 2009). There is variation in the professional background of the educator, format, and content of prenatal education classes in Canada (Best Start by Health Nexus, 2019; PHAC, 2009). Most prenatal educators in Ontario are registered nurses, but not exclusively so, with many educators having certification in childbirth education or doula certification (Best Start by Health Nexus, 2019). The majority of women take prenatal education through publicly funded hospitals, health clinics, or community centres and less frequently through private companies (PHAC, 2009). While health care services are publicly funded in Canada, there may or may not be a fee for prenatal education classes delivered through non-profit organizations or the healthcare system (Best Start by Health Nexus, 2019). Albert Health Services (AHS) Calgary and Edmonton zones and the Saskatchewan Health Authority (SHA)-Saskatoon region charge a fee for prenatal education classes, which is waived for low income women, whereas SHA-Regina region offers free prenatal education to all (AHS, n.d.a, n.d.b; SHA, n.d., 2016). Many health regions offer classes in weekly and weekend formats (AHS, n.d.a, n.d.b; SHA, n.d., 2016). The classes can range from generic classes for any participants, to classes targeting a particular population such as adolescent mothers, multiple gestation pregnancy, refresher classes for multiparous women, and specific language or cultural populations (Best Start by Health Nexus, 2019).

Traditional prenatal classes are undergoing a change in relation to the increased availability of online technology, alongside women's increased use of this technology to seek support and health information. The Canadian Internet Use Survey found in 2012 83% of Canadian households had internet access, with the highest use (98%) among those with incomes above $98,000, and lowest use (58%) among those with incomes under $30,000 (Statistics Canada, 2013). A more recent 2016 survey found almost all Canadians under the age of 45 use the internet on a daily basis, with 94% of those under age 34 owning a cell phone (Statistics Canada, 2017b). Canadians perceive the internet to be useful for communication with other

people (77%), helpful to make informed decisions (52%), and time saving (66%) (Statistics Canada, 2017a). In light of these trends, registered nurses and other prenatal educators need to consider how easy access to the internet influences health decisions, social relationships, and attendance at online and in-person prenatal education classes. The SHA-Saskatoon region offers a fee based online prenatal education course for families who do not wish to attend in-person or are in rural areas lacking these particular services (SHA, 2016). Prenatal education classes are available online in Ontario (Best Start by Health Nexus, 2019). Nova Scotia has replaced most in-person prenatal education classes with a parenting website site and free online classes (Canadian Broadcasting Corporation News, 2014; Government of Nova Scotia, n.d.).

1.2.2 Great Britain

In Great Britain women most commonly attend prenatal education classes through the National Health Service (NHS) at no cost or for a minimal cost through a non-profit organization, the National Childbirth Trust (NCT) (NCT, 2017; NHS, 2015). The NHS (2015) website promotes prenatal education as a way for women to learn about healthy pregnancy, labour and birth, infant care, infant feeding, and maternal mental health, as well as a way to make friends. The NHS service offers various class formats and may cover all or some of this information, depending on the class type (NHS, 2015). The classes are typically facilitated by a midwife, once per week, in the last trimester with alternate formats available including classes for specific populations such as single women or for those who speak other languages (NHS, 2015). The NCT (2017) offers courses in a small group format for a fee, with some financial assistance given to women with low income. A variety of options are available from comprehensive classes which cover childbirth, early parenting, feeding, infant care and pregnancy, to shorter classes in a weekend format (NCT, 2017).

1.2.3 United States

Birthing classes, parenting classes, and breastfeeding classes are commonly offered throughout the United States (Office on Women's Health US Department of Health and Human Services, 2017). Classes are offered through physician's offices, hospitals, birth centres, and private individuals (American Pregnancy Association, n.d.). Approximately half of mothers who take classes do so in a weekly format, and half take a one two-day weekend workshop (Declercq, Sakala, Corry, Applebaum, & Herrlich, 2013). The American Pregnancy Association (n.d.) suggests hospital based classes provide basic information on childbirth with hospital specific

practices, whereas non-hospital based classes provide an increased depth of knowledge and skills for emotional and physiological support in childbirth.

1.2.4 Australia

Childbirth and Parenting Educators of Australia (CAPEA) (n.d.) stated there are several options for prenatal education in Australia, from courses focusing on birth and parenting, to specific courses aimed at early pregnancy, fathers, caesarean birth, breastfeeding, multiple births, online courses, and culturally specific classes. A typical birth and parenting course averages 12 hours in length in a weekly or weekend format (CAPEA, n.d.). Courses often have fees and are offered in the public and private sectors (CAPEA, n.d.). As one example of the offerings for prenatal education classes in Australia, the Australian Central Territory (2017) offers prenatal education classes through many of its healthcare agencies including hospitals and community health centres. There are weekday and weekend options, as well as classes solely for breastfeeding, fathers, and adolescents, with at least some classes offered free of charge (Australian Central Territory, 2017).

In summary, in high resource countries such as Canada, the United States, Great Britain, and Australia, prenatal education classes are a conventional method of providing support to new families learning about pregnancy, childbirth, and early parenting. Classes are offered in a variety of formats, most commonly in a weekly or weekend format, with some organizations offering free classes, and other organizations requiring a fee which is often waived for low income families. The classes are often facilitated by healthcare professionals, although not necessarily a requirement, and are often delivered through the healthcare system, although there are also classes available privately.

1.3 Acceptance and Attendance

Prenatal education classes have been available for decades and have become a cultural expectation of pregnancy for mothers (Koehn, 2008). This cultural expectation is one reason mothers attend the classes (Ahldén et al., 2012; Koehn, 2008). In Canada, the Canadian Maternity Experiences Survey demonstrated 65% of primiparous women and 6% of multiparous women attend prenatal education classes (PHAC, 2009). There has not been a subsequent national survey published with which to compare results. A survey of women who experienced hospital birth in Ontario found 42% of nulliparous women attended online or in-person prenatal education classes with a range of 22%-58% attendance (Best Start by Health Nexus, 2019). The

author suggested interpreting these results with caution due to missing data. The rate of attendance for primiparous mothers at prenatal education classes has been decreasing in the United States. The first American Listening to Mothers survey (2002) noted 70% of new mothers attended classes, whereas the Listening to Mothers III survey (2013) found 59% of new mothers attended classes (Declercq, Sakala, Corry, Applebaum, & Risher, 2002; Declercq et al., 2013). This drop is not explained in the literature, but one might speculate this may be due to the increase in internet use and availability of prenatal education resources on the internet. The rise of technology is changing the way women access information and support. Fleming, Vandermause and Shaw (2014) found women used the internet to seek community with other women and for information on pregnancy, birth, and infant care to supplement and aid their understanding of information received from family and health care providers. Fleming et al. found the downside to this trend is that women can receive inaccurate or anxiety provoking information, and women perceived health care providers were not promoting quality websites or web locations to connect with other women. Prenatal education must consider its role in supporting women in the use of new technologies and adapt to this future.

1.4 Demographics of Prenatal Class Attendees

There is a distinction in the demographic variables between women who choose to attend and not attend prenatal education classes. A national American survey found attendees of prenatal education classes are significantly more likely to be Caucasian, college educated, married, and income resourced women (Lu et al., 2003). An Ontario survey found participation in prenatal education classes was lowest among mothers under 24 years of age and in communities which had lower levels of education and income, and higher levels of immigration (Best Start by Health Nexus, 2019). The characteristics of non-attenders in a Swedish study were low income or unemployed, non-Caucasian, less educated, single, unable to speak the dominant language, have less prenatal care, have an unplanned pregnancy, have considered abortion, and have an increased likelihood of tobacco use (Fabian, Rådestad, & Waldenström, 2004). An Ontario focus group of mothers who did not attend prenatal education classes described the barriers to attendance as cost, lack of awareness of the classes, and a perception the classes are of no benefit (Region of Peel Health Department, 2004).

1.5 Format of Prenatal Education

There are varying formats for prenatal education, with the most usual being a formal weekly series or a weekend course (Declercq et al., 2013; PHAC, 2009). A recent literature search in Ontario found while prenatal education is most commonly offered in this manner, there are a number of additional formats currently used including offering independent classes in which mothers can choose to attend topics of interest, drop in classes, one on one education, online education, prenatal fairs, and social media (Best Start by Health Nexus, 2019). Canada's *Family-Centred Maternity and Newborn Care: National Guidelines* suggest prenatal education topics may be included in one series of classes or broken down into phases of pregnancy, labour and birth, coping with the pain of labour, and the postpartum period (Health Canada, 2000).

The traditional weekly series or weekend scheduled approach may not be what parents' desire. A research study examining parent preference for prenatal education strategies found parents wished to have a variety of program options throughout the preconception to postpartum period in which they can receive information, ask questions, learn and discuss issues with a professional, and share and support one another (Svensson, Barclay, & Cooke, 2008). The parents preferred to have a variety of options they can choose from including: (a) traditional facilitator led closed group prenatal education classes, (b) formal topic specific lecture style classes with a question and answer session, (c) an open group format allowing parents to attend only the topics they are interested in, (d) informal participant led social opportunities for support and sharing, and (e) a 24-hour telephone support line (Svensson, Barclay, & Cooke, 2008).

A search of the literature noted there are research studies examining prenatal education classes with the typical childbirth and parenting components, and classes for pregnant women which focus on a specific topic such as postpartum depression (PPD) or parenting, with no childbirth component. For example, Bryan's (2000) research examined prenatal education in the form of a three-class series for couples focused on parent-child interaction. Leung and Tam's (2012) study examined a series of four classes on interpersonal psychotherapy aimed at women to reduce stress and depressive symptoms. Feinberg and Kan (2008) conducted research on prenatal education classes focused on co-parenting.

Ateah (2013) suggested prenatal parenting education programs are not widespread throughout Canada, with most parenting education delivered via traditional prenatal education classes with a childbirth component. A web search revealed current prenatal class offerings in Saskatoon and Regina consisted only of prenatal education classes with a childbirth component

(SHA, n.d.; SHA, 2016). On the other hand, the Calgary zone of AHS offered a variety of prenatal classes, both classes with a childbirth component and classes without a childbirth component (AHS, 2016). The non-childbirth classes focused on a particular topic such as nutrition, couple massage, calming baby in pregnancy, baby care, and breastfeeding; as well, there are classes aimed at fathers, siblings, and grandparents (AHS, 2016). Vancouver Coastal Health (2017) offered a treatment and support group for PPD which pregnant women may also access. It is of value to consider if classes during pregnancy focusing on specific psychosocial topics typically found in traditional prenatal education courses have an impact on postpartum outcomes. There may be a benefit of having a variety of options in prenatal education, as long as program objectives are clearly identified, so women can choose the type of class which best suits their needs (Health Canada, 2000).

Prenatal education classes have been available for several generations, and as such have become an integral part of the experience of becoming a mother, particularly for many primiparous women. As prenatal education is a common and long-standing nursing intervention, it is important to ensure this education is a good use of public resources and nursing time. There is an unexplained measurable decrease in the attendance of classes in the US; it is currently unknown if this is occurring in Canada. Evidence suggests women would like to see more flexibility in the format of classes. Therefore, as registered nurses and prenatal educators, we must ask whether prenatal education classes are effective in meeting their intended goals. A systematic review assessing the effectiveness of prenatal education will examine whether the goals of prenatal education for the healthcare system and for mothers are being met. For the purposes of this study, prenatal education is defined as a structured class attended by three or more participants, with a planned curriculum which provides information through an educational or learning component.

CHAPTER 2

LITERATURE REVIEW

A literature review was conducted to explore the current state of prenatal education classes in western high resource countries including content and goals, the role of the prenatal educator, and perceptions of healthcare providers and parents. Existing published systematic reviews related to prenatal class education are described. Finally, research considerations for public health interventions are explored, leading to a discussion of the scope of the problem, and the need for, purpose, and relevance of the current systematic review.

2.1 Prenatal Education Classes

2.1.1 Content and Goals

Western countries such as Canada, the United States, Great Britain, and Australia provide prenatal education classes to new parents to support learning on pregnancy, childbirth, and early parenting. This literature review will examine the content and goals of prenatal education from these countries as an example of prenatal education goals in a sample of western countries. World Health Organization (WHO) documents will also be examined for insight into the international recommendations for prenatal education.

The WHO (2016) identified the goal of prenatal care as creating positive health conditions for both mother and baby through risk identification, prevention and management of pregnancy related or concurrent diseases, and health education and health promotion. The WHO does not have specific guidelines for prenatal education classes, but within guidelines for prenatal care discuss the need for education and health promotion on many topics which are typically covered in prenatal education classes including breastfeeding, education on uncomplicated labour, common pregnancy complaints, and newborn care (WHO, 2016). The WHO has published separate documents solely on the topics of maternal mental health and breastfeeding education in health services for prenatal women. It is suggested both prevention and treatment of maternal mental health issues are important during the prenatal and postnatal periods, and educating women and families during pregnancy on the importance and management of breastfeeding is of value (WHO, 2008, 2018). The WHO suggested community-based interventions promote

communication, education, and support of pregnant women (WHO, 2016). Women involved in participatory community groups may self-identify barriers and solutions to care and their own needs (WHO, 2016).

The British clinical guidelines for prenatal care described prenatal education classes as useful for both information and support for families' social, emotional, psychological, and physiological needs (National Collaborating Centre for Women's and Children's Health (NCC-WCH), 2008). The guidelines recommended women be offered participant led prenatal education and be given evidenced based information to support informed decision making (NCC-WCH, 2008). It is suggested pregnant women need information on prenatal nutrition, lifestyle advice, fetal development, prenatal screening, breastfeeding, maternal mental health, infant care, postnatal self-care, labour and birth, coping with pain, and newborn screening (NCC-WCH, 2008).

American clinical prenatal care guidelines suggested women be informed of prenatal classes at 22 weeks but did not specify any particular guidelines on goals, content, or format for prenatal education classes (Akkerman et al., 2012). The prenatal care guidelines for healthcare practitioners encouraged counselling and education for women on topics such as nutrition, fetal development, preterm labour, pregnancy physiology, breastfeeding, PPD, and labour and delivery issues (Akkerman et al., 2012).

Australian prenatal care guidelines suggested healthcare providers promote prenatal education classes as beneficial for providing information about pregnancy, childbirth, and parenting to parents, and providing the opportunity to build connections with other parents (Australian Health Ministers' Advisory Council, 2014). The Australian guidelines also suggested research has demonstrated psychological preparation in prenatal education improves maternal mental health (Australian Health Ministers' Advisory Council, 2014).

The overall goal of prenatal care in Canada is to detect, treat, and prevent negative health outcomes for mothers and infants via the three components of risk assessment, treatment, and education (PHAC, 2009). Prenatal education classes are one aspect of prenatal care in Canada. According to Canadian national guidelines for maternity and newborn care, the broad areas of importance for prenatal education classes are pregnancy, labour, birth, and the postpartum period (Health Canada, 2000). The goals of prenatal education classes are to support healthy lifestyles, self-esteem and self-competence, communication and the family relationship, childbirth

preparation, postpartum adjustment, infant feeding with emphasis on breastfeeding, and increased communication between the woman and her healthcare provider (Health Canada, 2000). The classes should touch on the topics of pregnancy, labour, birth, early parenting, infant feeding, changing roles and relationships, sexuality, and family planning, with further detailed lists of topics provided in the guidelines (Health Canada, 2000). PHAC (2009) described the benefits of prenatal education as potentially promoting mother-healthcare provider communication, family relationships, breastfeeding, self-esteem and self-confidence, increased birth satisfaction, and decreased use of analgesics in labour.

To summarize, the goals of prenatal care are to detect, treat, and prevent negative health outcomes for mothers and infants by identifying risks, using health education and health promotion to prevent health concerns, and managing pregnancy related disease. Prenatal education, as one component of prenatal care, includes education on several topics such as pregnancy, childbirth, parenting, maternal mental health, social connection, sexuality, and breastfeeding. No guidelines were found which prioritize or suggest the amount of time which should be allotted to topics of importance in prenatal education.

2.1.2 Role of the Prenatal Educator

Canada's national maternity and newborn care guidelines and the ICEA have defined the role of the prenatal educator. The Canadian guidelines described the prenatal educator as one member of the healthcare team, whose role is to facilitate information and skills to support women in the physical, emotional, and social aspects of pregnancy, birth, and early parenting, as well as to support women in the awareness of the natural ability of their bodies to birth, and to advocate for women and families (Health Canada, 2000). It is also important for healthcare professionals to help expectant mothers make sense of vast amounts of health information and identify accurate information to make informed decisions (Health Canada, 2000). This is particularly important as the internet is a frequent source of information that may be of mixed quality. ICEA defined the role of the prenatal educator as providing professional learning and skills to a woman and her support person on the psychology, sociology, and physiology of pregnancy, childbirth, postpartum and early parenting periods (Gates, 2015).

2.1.3 Healthcare Provider Perceptions

There is a discrepancy among healthcare providers in the value of parenting education in prenatal classes. Some research suggests healthcare providers value health education and

supporting parents in learning about the transition to parenthood, increasing confidence in the biological process, and promoting infant-parent attachment in prenatal education (Ahldén, Görnsson, Josefsson, & Alehagen, 2008). In contrast, Svennson, Barclay, and Cook's (2007) research study on healthcare providers' perceptions of the learning needs of new parents found midwives, prenatal educators, and child and family nurses felt women were not ready for parenting information during the prenatal period. The health professionals perceived women as being unable to listen to information about postpartum issues because they are focused on birth and not ready to hear other information (Svennson, et al. 2007). The professionals perceived themselves as knowing what expectant parents want and had significant reluctance in changing educational methods from the status quo (Svennson, et al. 2007). Other research suggests many prenatal educators believe supporting families includes recognizing and adapting to online formats, supporting women in the use of online material, utilizing evidence-based knowledge, and recognizing family diversity (Best Start by Health Nexus, 2019).

2.1.4 Parent Perceptions

Parents desire to know what is expected throughout the pregnancy and early parenting period and wish to know how to perform well as a parent (Svennson, Barclay, & Cook, 2006). Parents prepare for birth and parenting by talking and observing others, seeking support from prenatal education and other sources, and learning from experience as they parent (Svennson et al., 2006). Prenatal education classes are one method in which parents prepare for birth and parenting; therefore, it is of value to consider parents' perception of the classes.

Research has examined mothers' views of prenatal education classes. A qualitative study on mothers' perceptions of the benefits of prenatal education classes found mothers valued the classes for knowledge gain, strengthened relationships with their partner, increased self-confidence, and feelings of empowerment (Koehn, 2008). A survey by Ahldén et al., (2012) found women have a variety of expectations of prenatal education classes; 91% of women expect the classes to help them feel more secure as parents, 87% want to feel secure in newborn care, 87% expect classes will help them manage childbirth, 83% would like to meet other mothers in the classes, and 80% expect classes will decrease the fear of labour pain. Although the majority of women felt that labour pain and childbirth was an important aspect of prenatal education, the top two reasons for attending were for parenting support such as feeling more secure in parenting and newborn care (Ahldén et al., 2012).

Although research suggested women value parenting as content in prenatal education, some women suggest prenatal education does not prepare them adequately for parenthood (Deave, Johnson, & Ingram, 2008). A study that examined women's' perceptions of the value of prenatal education after they gave birth found many women still felt unprepared for labour and believed that prenatal education could not prepare women for labour; therefore, less time should be spent on labour and more time on parenting topics (Schneider, 2001). A focus group in Ontario found women desired more information on several areas in prenatal classes including infant care, PPD, and local prenatal and parenting resources (Region of Peel Health Department, 2004). Fabian, Rådestad and Waldenström (2005), found only 40% of mothers stated prenatal education prepares them for parenting, with women at social risk less likely to find parenting information helpful.

Qualitative research that examined women's preferences for educational approaches found many women feel prenatal education classes do not allow for sufficient discussion time and do not encourage socialization (Nolan, 2009). Women preferred small classes where they can ask questions of a healthcare professional and make social connections (Nolan, 2009). Further research by Nolan (2012) found women wish to make friends with other mothers at prenatal classes, but not all classes are conducive to this. Making friends was dependant on the level of interactivity provided by the class and the homogeneity of the group as women who felt different from other group members did not seek friendship (Nolan, 2012). Although friendship support is beneficial to mothers, prenatal educators find it is increasingly difficult to create community in prenatal educations classes as class length becomes shorter (Morton & Hsu, 2007).

Social support is an important variable affecting maternal mental health. Several research studies have demonstrated a relationship between poor social support and PPD and anxiety (Aktan, 2012; Leahy-Warren et al., 2012; Razurel & Kaiser, 2015). It is interesting to note the Canadian guidelines identified support for maternal mental health as a goal of prenatal education classes, but do not identify social support from other class participants as a goal (Health Canada, 2000). British and Australian outcomes for prenatal education classes do suggest socialization as a goal (Australian Health Ministers' Advisory Council, 2014; NCC-WCH, 2008). Given that British and Australian sources and women themselves identify peer social support as relevant to prenatal education classes, and it is known that social support impacts maternal mental health,

registered nurses and other prenatal educators must consider whether social support should be an explicit goal for Canadian mothers.

2.2 Systematic Reviews

There are a substantial number of goals for prenatal class education covering pregnancy, labour and birth, and the postpartum periods (Health Canada, 2000). As such, it is difficult for one systematic review to consider all the outcomes of importance for prenatal education classes. The above review of the literature suggests mothers generally feel the emphasis on birth content versus postpartum content does not prepare them adequately for parenthood (Deave et al., 2008; Fabian et al., 2005; Region of Peel, 2004). This research project focused on outcomes of importance during the postnatal period.

The WHO (2016) included numerous topics of importance for the postpartum period, such as breastfeeding, maternal mental health, and newborn care. The Canadian national guidelines did not give specific goals for each period during the transition to parenthood, but within the goals and topics, there are several related to the postpartum period (Health Canada, 2000). These included self-esteem and self-competence, communication and the family relationship, postpartum adjustment, infant feeding, early parenthood, changing roles and relationships, as well as sexuality and family planning. To summarize and categorize the above postpartum goals of the WHO and the Canadian national guidelines, the goals of prenatal education of importance regarding the postpartum period are: maternal mental health (includes self-esteem, self-competence, and postpartum adjustment), social support (includes communication, the family relationship, changing relationships), breastfeeding, infant care, transition to parenthood (changing roles), and sexuality (includes family planning). A search of the literature for the current state of systematic reviews for prenatal education classes with the postpartum outcomes identified above will follow.

2.2.1 Systematic Reviews on Prenatal Education Classes

Koehn's (2002) qualitative and quantitative literature review of prenatal education outcomes aimed to describe the current state of research regarding prenatal education from 1995-2001. This review of 12 studies included eight descriptive studies, three qualitative, and one pre-post quasi-experimental published in English with no geographic restrictions identified (Koehn, 2002). There was inconclusive evidence for the effectiveness of prenatal education due to the heterogeneity of the studies, with a broad range of issues and methodologies used in research.

The studies had small sample sizes, lacked reliability and validity of measures, and did not consider confounding variables (Koehn, 2002).

Gagnon and Sandall (2007) conducted a Cochrane (systematic) review of nine randomized controlled trials (RCT) that examined the effectiveness of individual or group prenatal education on birth and parenting outcomes for mothers or fathers. This review did not have any language or geographic restrictions. This research considered the outcomes of knowledge acquisition, anxiety, labour pain, sense of control, pain medication use, partner involvement in birth, obstetrical interventions, breastfeeding, infant care, social support, and psychological/social adjustment to parenthood, however the studies did not report any findings for the outcomes of anxiety, breastfeeding, or social support. They found insufficient evidence to support prenatal education as being of benefit for the remaining outcomes and made no practice recommendations due to small sample sizes and uncertain quality of the trials. As this was a Cochrane review, the research was limited to RCTs (Gagnon & Sandall, 2007). The stringent nature of RCTs may have excluded relevant research designs and studies of interest to registered nurses and other prenatal educators.

The most recent systematic review of prenatal education examined obstetric and psychosocial outcomes in small groups of 20 or fewer participants (Brixval et al., 2015). This systematic review found 17 RCT, quasi-experimental, and cluster-randomized trial studies published between 1988-2014, limited to research from countries on the Organization for Economic Cooperation and Development (OECD) list (Brixval et al., 2015). The outcomes reviewed included the primary outcomes of pain relief, obstetric interventions, psychological/social adjustment, and antenatal/postnatal PPD, and secondary outcomes of knowledge acquisition, sense of control, partner involvement in birth, breastfeeding, infant care, social support, relationship satisfaction, and divorce/separation (Brixval et al., 2015). The interventions included both prenatal education with a childbirth education component and without a childbirth education component, as well as a variety of controls including standard care, other prenatal education classes, and other forms of education such as one-one education, and parent literature. This systematic review found heterogeneity in the interventions and outcomes, a limited number of trials had statistically significant differences with no consistency in outcomes, and most studies were defined as having a high risk of bias; thus, there was insufficient evidence to support the intervention (Brixval et al., 2015).

A literature search was conducted to determine if there are any systematic reviews specific to each of the outcomes of interest, beyond what was found in systematic reviews of prenatal education classes. This search identified systematic reviews specific to the outcomes of maternal mental health and breastfeeding. However, no reviews specific to the outcomes of social support, infant care, transition to parenthood, or sexuality were located.

2.2.2 Systematic Reviews on Maternal Mental Health

There were several systematic reviews exploring maternal mental health interventions. Firstly, Fontein-Kuipers, Nieuwenhuijze, Ausems, Budé, and de Vries (2014) undertook a systematic review and meta-analysis of group and individual prenatal interventions for healthy minimal risk western women to reduce maternal distress. This review examined RCTs published from 1999-2011, with 10 included studies. The review included preventative interventions of prenatal education programs, mentoring, music therapy, and group prenatal care. The interventions demonstrated no benefit for mothers overall, although a subgroup analysis of studies of samples of women vulnerable to maternal distress showed a small but significant benefit from group prenatal care and mentoring (Fontein-Kuipers et al., 2014). The study also examined treatment interventions (mindfulness, acupuncture, and a self-help workbook) which demonstrated a small but significant positive result for mothers with maternal distress (Fontein-Kuipers et al., 2014).

Dennis (2005) conducted a systematic review and meta-analysis of a variety of psychosocial and psychological prenatal and postnatal interventions for PPD published between 1980 and 2004, finding 15 RCTs. The meta-analysis did not demonstrate a clear benefit for prenatal and postnatal interventions to prevent PPD (Dennis, 2005). Sub-analysis demonstrated postnatal interventions for women of greater risk may have increased benefit while group interventions did not demonstrate a benefit (Dennis, 2005).

Clatworthy's (2012) systematic review examined the effectiveness of group and individual prenatal interventions for women at risk of PPD. This review examined RCT literature published up to 2010, finding 11 studies. Group interventions had mixed results. The research demonstrated interventions for women with moderate to severe PPD had a positive effect but there was no effect for women with low to no risk (Clatworthy, 2012). Interventions involving psychological therapy were found to be more effective than educational interventions for addressing PPD (Clatworthy, 2012).

Alderdice, McNeill, and Lynn (2013) conducted an *umbrella* review (systematic review of systematic reviews) on education, screening, and support interventions for maternal mental health during pregnancy and postpartum. This review examined literature published between 1999 and 2010, finding 32 systematic reviews. Alderdice et al. organized the findings by prenatal and postnatal time periods, as well as screening, intervention, debriefing, treatment, parent training, and generic categories. The umbrella review found the systematic review literature includes a broad range of perinatal interventions for women and a lack of consistency in the quality of the studies making it difficult to make practice recommendations (Alderdice et al., 2013).

The reviews on prenatal interventions that address PPD or maternal distress both examined multiple types of interventions to prevent PPD and were limited to RCTs (Clatworthy, 2012; Dennis, 2005, Fontein-Kuipers et al., 2014). A systematic review focused on the single intervention of prenatal education classes is warranted.

2.2.3 Systematic Reviews Regarding Breastfeeding

The search of the literature found five recent systematic reviews of breastfeeding interventions during the prenatal period. Sipsma, Jones, and Cole-Lewis' (2015) systematic review of breastfeeding education interventions for adolescents synthesized six studies. Prenatal and postnatal interventions of home visiting, group prenatal education classes on breastfeeding, peer and professional support, and telephone support were included. The results of the review indicated the types of interventions for adolescents are similar to those which have been found successful in adults, but the results were inconsistent; therefore, this systematic review recommended breastfeeding education for adolescents must consider the unique needs of adolescents for the classes to be successful (Sipsma et al., 2015).

Wong, Tarrant, and Wan Lok's (2015) systematic review of group versus individual professional prenatal breastfeeding education included 19 studies for their synthesis. The group education interventions were variable, with some containing breastfeeding-only information, and others containing breastfeeding education in conjunction with other prenatal education. The results of their review found individual prenatal breastfeeding interventions improved breastfeeding duration in high risk populations, but not in low risk, educated populations (Wong et al., 2015). Due to issues with study quality and heterogeneity the authors were unable to make

practice recommendations for group interventions (Wong et al., 2015). Interestingly this review examined both RCT and quasi-experimental research (Wong et al., 2015).

Oliveria et al.'s (2017) meta-analysis of educational interventions for breastfeeding promotion examined 11 studies. The review considered any educational intervention for breastfeeding, alone or in combination with other educational interventions during the prenatal and postnatal periods. The educational interventions included home visits, videos, phone calls, text messages, classes, individual sessions, literature, and a theatrical presentation, with most studies utilizing more than one intervention (Oliveira et al., 2017). The two most successful prenatal interventions included: (a) support with breastfeeding and a follow-up postnatal home visit, and (b) prenatal to postpartum home visits with education and written material, (Oliveira et al., 2017). Of note, this review was not consistently clear in identifying whether education sessions were group or individual, and examined solely RCTs.

Wood, Woods, Blackburn, and Sanders' (2016) systematic review examined six studies of breastfeeding education in the prenatal and postpartum periods. Half of the studies examined breastfeeding education in the prenatal period with literature, video, counselling, and lecture the interventions used by these studies (Wood et al., 2016). Two of the studies provided education specific to breastfeeding, whereas one study provided a breastfeeding workshop within the context of a three-part prenatal education class (Wood, et al., 2016). Two of the studies provided education in a class or lecture format; the third study did not specify if it was group or individual education. Wood et al. (2016) found women in their review gained skills, knowledge, and self-efficacy in the prenatal period but had difficulty in transferring this knowledge to the postpartum period, leading to early declines in exclusive breastfeeding. Wood et al. (2016) suggested a need for further study to improve the transfer of knowledge from education to the practice of breastfeeding.

Wouk, Tully, and Labbok's (2017) systematic review of prenatal breastfeeding education interventions for pregnant women in clinic or hospital settings examined 38 RCT and quasi-experimental studies. This review considered prenatal breastfeeding education alone and in combination with other prenatal education components. The breastfeeding education took many forms including informational support and interpersonal support in both home visits, individual, and group education. The results indicated prenatal breastfeeding education alone, or in combination with other prenatal education, was beneficial to breastfeeding initiation, duration,

and exclusivity, with improved success when combined with interpersonal support (Wouk et al., 2017). This review did not specifically identify group prenatal breastfeeding classes separately from other breastfeeding interventions.

In summary, there have been five systematic reviews on breastfeeding education published in the last four years. Three reviews examined RCTs, and two examined RCT and quasi-experimental designs. These reviews examined multiple types of breastfeeding education interventions, with most interventions specific to breastfeeding and some interventions part of other educational interventions. Of note, the two reviews with small samples demonstrated greater negative outcomes than the systematic reviews with larger samples. The two reviews which included quasi-experimental designs in addition to RCTs had much larger samples.

2.2.4 Research Considerations for Public Health Interventions

Systematic reviews are of benefit to public health interventions as they can find patterns which would be unattainable when looking at individual trial results (Shelton, 2014). It is important to examine a variety of research designs to find patterns, including RCTs, quasi-experimental, and demonstration projects (Shelton, 2014).

Public health research must also examine a variety of types of research due to the limitations of RCTs in the public health setting (Victora. Habicht, & Bryce, 2004). Many of the current systematic reviews are limited to the research design of the RCT which may restrict their applicability to public health interventions (Clatworthy, 2012; Fontein-Kuipers et al.; Gagnon & Sandall, 2007). RCTs can be difficult in real world situations as true randomization is problematic (Grove, Burns, & Grey, 2013; Shelton, 2014). Public health research cannot only consider the *gold standard* of probability research, as it must also take into account what is plausible; in other words, consider research with a comparison group even when not randomized (Victora et al., 2004). Gagnon (1995, as cited in Gagnon, 2007) found only 10% of pregnant women are willing to be randomized into a class versus no treatment arm of a study, which was hypothesized to be due to the popularity of prenatal education classes among mothers. There is also an ethical issue when requiring the randomization of women into a nonattendance group when the prenatal classes are perceived by mothers as beneficial and there is evidence of effectiveness for some outcomes. As such, a systematic review on prenatal education assessing quasi-experimental study designs in addition to RCTs is justified.

RCTs may fail to consider causal pathways which are inevitably complex in real world situations (Shelton, 2014). A major consideration for systematic reviews of public health interventions is the common inability to control the causal pathway from the intervention to the outcome (Victora et al., 2004). In prenatal education, it is not possible to only study the effect of the intervention; consideration must be given to program integrity such as the skill of the educator, the program objectives, the learning style of the mothers, best practices in the delivery of the intervention(s), and subject compliance in attending the intervention (Victora et al., 2004). It is important to consider the complex nature of prenatal education classes and the context of mothers' lives, as there are no perfect conditions. It is expected there will be some variance; therefore, it is important for systematic reviews to examine information on the delivery and compliance of the intervention (Victora et al., 2004). Intervention compliance can be assessed by participant attendance at prenatal education classes. Other considerations to make are the dose-response relationship between the intervention and the outcome, and any competing interventions (Victora et al., 2004). Pregnant women receive information from a variety of sources, making it difficult to assess the effect of the education intervention in isolation to other potential sources of information such as friends and family, health care providers, and the internet.

There are different considerations given to internal and external validity in RCTs and public health research. RCTs are used to improve internal validity; in other words, the RCT demonstrates efficacy, but not effectiveness (Mullen, 2006). Public health interventions can examine efficacy, or ideal interventions, but often must examine effectiveness questions of routine interventions (Victora et al., 2004). Public health interventions need to consider external validity to generalize findings for populations, yet external validly may be a weakness of the RCT, as they may or may not be generalizable (Shelton, 2014; Victora et al., 2004). There may be an assumption that RCTs with strong internal validity (due to controlling for biases) will ensure its external validity and make it generalizable to the greater population (Victora et al., 2004). In considering the generalizability of RCTs in public health research, one must take into account how the behaviour of health systems, the environment, and human behaviour affect the dose of the intervention and how the dose response (such as competing interventions, absence or presence of an important co-factor) influences the intervention (Victora et al., 2016). Due to the difficulty in control and randomization within the context of prenatal education classes, and in

order to capture a more complete picture of what is known in the literature, it is imperative the present systematic review includes and examines trials less stringent than RCTs.

2.2.5 Gaps in the Current Systematic Review Literature

There is a gap in the systematic review literature examining prenatal education as most of the present reviews on prenatal education are greater than five years old. There is value in conducting an updated systematic review as it is important that public health practitioners keep current with the published literature (Groves et al., 2013). The current systematic review addresses this gap.

The Brixval et al. (2015) review is most recent and examined research up to March 2014. Yet, this review is now five years old, considered only small class size prenatal education, and utilized the OECD list to define western health systems. Thus, the current review examines all countries to encourage usability by countries in which prenatal education classes may be occurring, removes the limit of small class size, and updates the most recent literature available.

The current systematic review further addresses gaps found in other reviews. The previous reviews on maternal mental health examined multiple types of interventions, whereas the current review focuses on one intervention of a structured group education class for pregnant women. The current systematic review includes multiple quantitative research designs such as RCTs, matched cohort designs, and repeated measures with a control group to ensure a broad consideration of the outcomes currently available to make recommendations for practice. The current review also uses a validity tool to address the varying levels of bias (Forbes, 2003). Information on program integrity strengthens the validity of the results (Victora et al., 2004).

There have been five systematic reviews on breastfeeding education published in the last four years. These systematic reviews examined both RCT and quasi-experimental research designs (Wong et al., 2015, Wouk et al., 2017). The inclusion of more than one research design increased the number of studies included in the reviews and increased the applicability of the reviews for public health interventions. As there is sufficient current knowledge regarding the effectiveness of prenatal breastfeeding education, this outcome will not be included in the present study.

Some of the systematic reviews previously discussed also examined birth outcomes. Brixval et al. (2015) and Gagnon and Sandall's (2009) systematic reviews found individual studies reported prenatal class attenders had shorter labours and increased spontaneous vaginal

labour, but no significance for use of epidurals or rates of medical interventions (Brixval et al., 2015; Gagnon & Sandall, 2009). Both reviews noted difficulty in making practice recommendations due to small samples, inconsistent quality of trials, and heterogeneity of outcomes (Brixval et al., 2015; Gagnon & Sandall, 2009). Ferguson et al.'s (2013) structured review on prenatal education birth outcomes found prenatal education classes may reduce false labour admissions, decrease anxiety and improve partner participation, with no change in type of birth, an increase in epidural use, and an increase in induction of labour. Based on these reviews, there is some evidence that prenatal education classes have a positive impact for several birth outcomes. However, as prenatal education classes have multiple goals, it is difficult for a single systematic review to address all outcomes. The focus of the current review is limited to psychosocial outcomes during the postnatal period.

2.3 Scope of the Problem

The common nursing intervention of prenatal education classes have been available for several decades and have been so popular among mothers, they have become a part of the cultural transition to motherhood (Ahldén et al. 2012, Koehn, 2008). What began as labour and birth preparation has evolved to encompass information and support on pregnancy, childbirth, and parenting for childbearing families in many countries. The WHO (2016) suggested education be included as part of routine prenatal care globally, yet as evidenced by the above literature review, the research on prenatal education classes is primarily situated in high resource western countries. This current systematic review assesses research from any global region to aid generalizability of findings while recognizing that the findings will have more relevance for prenatal educators in high resource western countries given the current state of the literature. It is hoped the inclusion of studies from any region will enhance the possibility that the results may have some applicability to more diverse populations, particularly in low resource countries.

Although prenatal education classes discuss issues beyond just labour and birth, the major focus of the classes continues to be birth preparation (Ateah, 2013). There are no recommendations for the amount of time or a prioritization of topics for prenatal education. As women see prenatal education as an opportune time to learn about parenting, but do not always perceive the classes as helpful for parenting, it is of value to assess the effectiveness of classes on postpartum outcomes for mothers and infants (Deave et al., 2008). A systematic review is of benefit to gather relevant research to assist registered nurses and other prenatal educators and

policy makers in ensuring prenatal education classes are providing positive outcomes for mothers.

The goals of prenatal education classes can be broken down into larger categories of goals for the prenatal period, childbirth, and postpartum period. The aim of the current systematic review was to examine the outcomes of the postpartum period. The outcomes were considered based on the goals identified in the Canadian document *Family Centered Maternity and Newborn Care: National Guidelines*, as these are similar to the goals found in the UK and Australian, and included maternal mental health, social support, breastfeeding, infant care, transition to motherhood, and sexuality (Health Canada, 2000).

The current systematic review excludes breastfeeding due to sufficient recent systematic reviews on this outcome. The outcome of social support will include family and non-family forms of social support to take into account the value women place on social support from their partner and friendships with other new mothers, and the inclusion of the goal by British and Australian national guidelines. In summary, the current systematic review examines the outcomes of maternal mental health, social support, infant care, transition to motherhood, and sexuality during the postpartum period.

2.4 Purpose of the Study

Prenatal education classes have multiple goals across the perinatal period. The classes are a common experience for the majority of primiparous women in western countries. The current review aims to explore the effectiveness of the classes for psychosocial outcomes in the postpartum period based on the available research evidence. The purpose of this study is to assess the effectiveness of prenatal class education on the outcomes of maternal mental health, social support, infant care, transition to motherhood, and sexuality during the postpartum period to provide evidence and guidance for prenatal class design and delivery. The target audience for this review is prenatal educators, policy makers, and researchers in western countries since the applicability may be limited for low resource countries given the lack of research exploring prenatal education in those regions.

2.5 Relevance and Significance

It is important to ensure nursing interventions demonstrate the intended outcomes to improve women's pre and postnatal health and ensure proper stewardship of public resources. There are vast amounts of literature for healthcare professionals to peruse; therefore, a systematic

review can assist registered nurses and other prenatal educators in interpreting the body of research related to a nursing intervention (Forbes, 2003). Systematic reviews examine the quality of the available literature and synthesize the data to provide the best available evidence on the effectiveness of a particular intervention (Forbes, 2003). As there is a significant amount of literature on the topic of prenatal education, and prenatal education is a common and long-standing public health intervention, a systematic review, investigating the outcomes where a knowledge gap exists, will be useful to synthesize the data and demonstrate the effectiveness of this intervention attended by most primiparous mothers in high resource countries. The current systematic review helps inform registered nurses and prenatal educators, particularly in western countries, to ensure practice is evidence-based by examining whether the intervention of prenatal class education is effective for five postpartum outcomes which support a mother in achieving health for herself, her infant, and her family.

2.6 Research Question

The current systematic review examines the effectiveness of a prenatal intervention. The research question is: *What is the effectiveness of structured group prenatal education for mothers on maternal mental health, social support, infant care, transition to motherhood, and sexuality during the postpartum period?*

CHAPTER 3
METHOD

The following chapter is a discussion of the methodology of a systematic review. The research design for the current systematic review will be presented, as will the development of each step of the research method. The research question, search strategy, relevance and validity tools, data synthesis, dissemination of findings, and research ethics will be discussed.

3.1 Research Design

A systematic review is beneficial to synthesize the best available research evidence to support clinical decisions (Grove et al., 2013). The current systematic review aims to assess the effectiveness of structured group prenatal education on maternal mental health, social support, infant care, transition to motherhood, and sexuality for mothers. The current systematic review method is based on the previous work of Forbes (2003) and Peacock and Forbes (2004). Forbes' method of review was chosen as she is a researcher who is a registered nurse and her work has been utilized by other nurse researchers. Forbes' method provides for a logical and rigorous review applicable to research topics of importance to nursing. A systematic review is of importance when examining a public health intervention because of the limitations any one study has for generalizability to the broad population; systematic reviews allow for a comprehensive look on a given topic (Shelton, 2004). They are an important tool for registered nurses and other healthcare professionals because the literature is synthesized, making the results useable (Forbes, 2003).

In a systematic review study the research studies are considered the subjects of investigation (Forbes, 2003). The studies are examined collectively to answer the proposed research question. According to Forbes the steps of the systematic review are as follows: (a) develop a focused question of the effectiveness of a nursing intervention, (b) develop the relevance criteria and tool, (c) develop the validity criteria and tool, (d) search the literature to retrieve studies, (e) assess the studies using the relevance tool, (f) assess the studies using the validity tool, (g) extract the data, (h) synthesize the data, and (i) write the research report on the conclusion of the question. Each step of the process will be presented.

3.2 Developing the Research Question

The research question was formed from the personal clinical experience of the graduate student author. The author has worked as a community health nurse for 20 years, primarily working with mothers, infants, and families during pregnancy through the preschool years. This work has included prenatal education in the traditional weekly or weekend workshop format for the general population, targeted classes for young mothers, and work with socially vulnerable women in prenatal nutrition groups. The personal experiences of the author in working as a registered nurse with mothers struggling with PPD and anxiety, lack of support, and parenting issues suggests maternal mental health, social support, infant care, and transition to motherhood to be significant variables affecting the health of mothers and infants. This work has led to consideration of the impact of prenatal education during the postpartum experience.

The personal experience of the author combined with the literature search/review were used to focus the question based on the requirement for a population, intervention, and outcome (Forbes, 2003). The population under study are pregnant women. All pregnant women are included, regardless of parity or risk factors. Fathers are not included as there was little literature found on prenatal education and fathers; a systematic review is not possible at this time for the father population. The literature search demonstrated there are a variety of goals in prenatal education to support women prenatally, during labour and birth, and during the postpartum period. The current review focused on the postnatal outcomes of maternal mental health, social support, infant care, transition to motherhood, and sexuality. The chosen intervention was structured group classes occurring during pregnancy. Structured group classes are defined as a group of three or more participants, a minimum of one class, and a predetermined curriculum, as opposed to a support group. There is evidence in the literature to suggest there are classes delivered to pregnant women and families in the prenatal period which focus on a particular topic and do not include a childbirth component. It is of value to consider if such classes influence postpartum outcomes. The intervention included any classes with a childbirth component and classes without a childbirth component, if the class involved education on an aspect of social support, maternal mental health, infant care, transition to motherhood, or sexuality, in a group setting. In summary, the current systematic review examined the population of pregnant women, the intervention of structured group prenatal classes, and the postnatal outcomes of maternal mental health, social support, infant care, transition to motherhood, and sexuality.

3.3 Search Strategies

The literature search covered a broad selection of databases with the aim of uncovering relevant published and unpublished research. The following databases were searched in April 2018: CINAHL, MEDLINE, EMBASE, PsychINFO, Dissertations and Theses Global, Dissertations and Theses @ University of Saskatchewan, and the University of Saskatchewan catalogue of non-digitized theses. Search alerts were used to collect further studies for future analysis prior to publication. Limiters were used in the search for the period of 1998-2018 and English language. The searches were conducted with the support of an experienced health sciences librarian to ensure rigour.

Previous literature searches have revealed it is necessary to utilize a variety of terms, as many different terms are used to describe the outcomes and interventions studied. For example, prenatal education is synonymous with antenatal education and childbirth education. The search terms were selected to keep as much similarity among various databases as possible and maintain the number of search terms to a manageable level, while still capturing relevant studies. See Table 3.1 for a sample of the search terms used in the current systematic review. The intervention occurred at any time during the period of pregnancy and the outcomes sought are during the postpartum period from birth to 12-months, therefore terms covering both periods were used.

Table 3.1

Sample of Search Terms

Category of search term	Medline search terms	CINAHL search terms
Population	Pregnancy	Pregnancy
	Mothers	Mothers
	Pregnant women	Expectant mothers
	Parturition	Childbirth
Intervention	Prenatal education	Prenatal education-kw
	Childbirth education-kw	Childbirth education
	Antenatal education-kw	Antenatal education-kw
	Prenatal classes-kw	Prenatal classes-kw
	Antennal classes-kw	Antenatal classes-kw
	Childbirth classes-kw	Childbirth classes-kw
	Prenatal care	Prenatal care
	Education, nonprofessional	Parenting education
		Childbirth educators
Maternal mental health outcome	Mental health	Mental health
	Anxiety	Anxiety
	Depression, postpartum	Depression, postpartum
	Postpartum anxiety-kw	Postpartum anxiety-kw
	Prenatal 3adj anxiety	Prenatal n3 anxiety
	Postpartum 3adj anxiety	Postpartum n3 anxiety

Category of search term	Medline search terms	CINAHL search terms
	Emotional adjustment	
Social support outcome	Social support	Support, psychosocial
	Family relations	Family relations
	Friends	Friendship
	Social adjustment	Social adjustment
		Social networks
Transition to motherhood outcome	Adaptation, psychologic	Adaptation, psychologic
	Role	Maternal role
	Life change events	Life change events
	Maternal behaviour	Maternal behaviour
		Motherhood
Infant care outcome	Infant	Infant
	Infant care	Infant care
	Infant behaviour	Infant behaviour
	Parenting	Parenting
	Parent-child relations EXP	Parent-infant relations EXP
	Child development	Infant development
	Childrearing	Childrearing
		Parent-infant bond
Sexuality outcome	Sexology EXP	Sex education
	Postpartum sexual*-kw	Postpartum sexual*-kw
	Reproductive health	Reproductive health
	Sexual health	Sexual health
		Sexual counseling
Other	Postpartum period	Postnatal period

The search resulted in a total of 10,047 studies, with 8869 found in the original search in April 2018, an additional 1101 found in an updated search July 2019, and 77 found via author and reference list search of studies meeting the relevance criteria. The original search utilized the Bramer method of removing duplicates in EndNote X8, resulting in 6801 studies (Bramer et al., 2016; Clarivate Analytics, 2016). The files were transferred to Rayyan, a web based application, to examine titles and abstracts (Ouzzani et al., 2016). Rayyan provides an easy way, through the use of categories and key words, to quickly remove non-relevant studies.

The search resulted in capturing many types of prenatal interventions. Two reviewers (i.e., the graduate student and a supervisor) independently assessed a sample of 40 studies for the title and abstract review. The intent of the title and abstract review was to ensure studies with the relevant population, intervention, and outcomes remained while non-relevant studies were removed. If there was doubt, the study was kept out of an abundance of caution. Some particular discarded interventions included yoga, exercise, nutrition and diet, breastfeeding, addictions, education specific to HIV transmission, interventions involving large scale programs of multiple

and various services for underserviced areas, and interventions labeled as *visit*. Interventions labelled as *prenatal care* were removed if the abstract referenced a clinic as the term prenatal care is typically used to describe clinical care by a midwife or physician. If the abstract or title was not clear on what was meant by prenatal care the study was kept at this stage. Studies described as *group counselling*, *counselling*, and *session* were also kept if it was not possible to determine if the abstract met the intent of the research. The Rayyan web based application program utilizes a five-star system to predict which studies best match those which the user has selected to keep (Ouzzani, et al., 2016). When the process of removing studies by key word was complete, all excluded studies with three plus stars were reviewed again to ensure any relevant studies were not removed in error. The final list of included studies was examined a second time to ensure relevance, resulting in a remaining 180 studies.

The 180 studies were hand searched for any remaining duplicates not found by EndNote. The relevance tool was applied, and an author search and review of the reference list was conducted for all studies which passed, finding an additional 77 studies to be examined. In total 257 studies of interest were found. Of these seven were removed as duplicates and 10 were lost to follow-up. An experienced librarian attempted a search of the lost studies, finding them to be either non-scholarly works, not available in English, or not locatable. The relevance tool was applied to the remaining 240 studies, resulting in 69 studies relevant to the research question. The validity tool was then applied to assess the quality of the studies, with the aim to synthesize the strong and moderate quality studies.

An updated search was conducted in July 2019, utilizing all databases from the original search. This search examined literature published in 2018 and 2019. The search found an additional 1101 studies which were hand searched for duplicates, titles and abstracts, resulting in 11 articles to examine with the relevance tool, of which three met the original inclusion criteria. See Appendix A.1 for the PRISMA flow chart of the search results (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009).

3.4 Relevance and Validity Tools

The relevance and validity tools utilized for the current review are adapted from Forbes (2003) and Peacock and Forbes (2004). The relevance and validity tools were pretested and revised as needed. See Appendix B for the relevance tool and dictionary, and Appendix C for the validity tool and dictionary.

3.4.1 Relevance Criteria

Relevance criteria (i.e., inclusion criteria) evolve from the research question and examine the relevance of a study for inclusion in the review based on the population, intervention, and outcomes of the research question. (Forbes, 2003). The current systematic review included study designs involving a comparison of groups, such as RCT and matched cohort designs. Two reviewers (i.e., the graduate student and a supervisor) independently assessed 25 studies for relevance with the student assessing the remaining studies.

Criteria one involved a 20 year span to ensure a sufficient sample to perform the systematic review and to reduce time lag bias. Criteria two, English language, was added for practical reasons. It is recognized this introduced language bias and possibly bias towards studies published in western high resource countries.

Criteria three defined a structured group prenatal class as a minimum of one organized class of three or more pregnant women who attend classes alone or with a support person. Structured education referred to a planned curriculum which provided information or had an educational or learning intervention in relation to childbirth and/or the outcomes of maternal mental health, social support, infant care, transition to motherhood, and sexuality. Criteria four sought to include education in which more than half of the intervention occurred during pregnancy. The purpose of the research is to examine how the prenatal intervention affects outcomes during the postnatal period, therefore interventions delivered 50% or greater after birth were excluded.

Criteria five accepted studies using experimental and quasi-experimental designs, with comparison groups such as RCTs and matched cohort designs. Limiting systematic reviews to only RCTs eliminates research which is still of value to the topic as nursing intervention research often utilizes a variety of research designs (Forbes, 2003). Public health nursing research is often not compatible with RCTs due to issues with randomization of real-world study subjects and generalizability of findings (Shelton, 2014, Victora et al., 2004).

Criteria six defined the outcomes examined for the review. Broad outcome definitions were purposefully used as it was discovered during sample literature searches there are several similar terms and measurement tools in use which describe the outcomes. A broad interpretation of the outcomes ensured an adequate number of studies were included. Maternal mental health outcomes were defined as any measure of psychological well-being or distress. Social support

outcomes were defined as measures relating to any type of social support and measures of social relationships. Transition to motherhood included measures of transition, role, or adaptation to motherhood. Infant care outcomes were defined as any measure reflective of mother/infant attachment, parenting knowledge, skills, or behaviour. Sexuality outcomes were any measure of sexuality or family planning. Criteria seven ensured the outcomes were measured during the first year of the infant's life.

3.4.2 Validity Criteria

Potential bias in the design and execution of the study methodology must be examined to determine the strength of the study included in a systematic review (Grove et al., 2013). The validity tool must consider every area of bias which may be encountered in the research question (Forbes, 2003). There are several areas of validity (i.e., quality) to consider when examining the potential bias of a study including: selection bias, performance bias, detection bias, attrition, and outcome reporting bias (Higgins & Green, 2011). The criteria for the validity tool are adapted from Forbes (2003) and Peacock and Forbes (2004), with the addition of outcome reporting bias as suggested by the Cochrane Handbook for Systematic Reviews (Higgins & Green, 2011). The validity tool was pretested by two reviewers (the graduate student and one of her supervisors) with 10 studies. This allowed an opportunity to address any difficulties with the tool and adjust the finer points of the tool, ensuring the validity tool dictionary clearly described the parameters of the tool. A decision was made to adjust the criteria for the attrition rate and the type of statistical analysis. Following the pretest, the graduate student and supervisors assessed a total of 25 randomly selected studies to independently assess consistency between raters in the application of the validity tool, finding most studies were similarly rated. The few studies with differing assessments were discussed with both supervisors and consensus was reached. The graduate student assessed the remaining studies and consulted the supervisors if there was a lack of clarity in a study.

The current review did not examine performance bias, which refers to differences in the way the groups are treated or differences in their exposure of similar interventions other than the intervention in question (Higgins & Green, 2011). Performance bias includes issues arising from participant's knowledge of which group they are in, researchers differing treatment of groups due to knowledge of which groups participants are in, and program differentiation (concurrent education). Prenatal education class research occurs in the context of a common public health

intervention within the community for which most primiparous mothers wish to attend and in which prenatal educators work, making control of these variables difficult. There is an ethical issue in denying women prenatal education classes for the purposes of formulating a control group in communities in which the classes are available to the public. Program differentiation is the assessment of whether the study subjects received only the planned intervention (Dane & Schneider, 1998). Program differentiation was not assessed in the current review because it was acknowledged women seek information and support throughout pregnancy from a variety of sources that may or may not involve prenatal education classes (PHAC, 2009). An assumption was made that the selected studies for the current review will demonstrate a lack of program differentiation.

Selection bias is addressed with two questions on the validity tool, study design and allocation of subjects to groups, and control for confounders. Due to the nature of an intervention of a group class, it is difficult to have true random sampling to eliminate selection bias, although it was expected there would be studies which use random assignment to groups. The term 'matched cohort' included studies labeled as matched cohort design, studies labeled as RCTs in which groups were randomized rather than subjects, and non-random designs in which there were equivalent groups as determined via analysis. Control for confounders assessed the degree of similarity in sample characteristics between the groups. Studies were rated for control of confounders as to whether they were likely similar in groups via study design or statistical analysis, matched cohort design without regression analysis, and studies utilizing descriptive statistics or unknown differences.

Attrition bias was initially addressed via a cut-off of 20% based on the work of Forbes (2003). Systemic bias increases when a sizeable number of participants withdraw from a study or withdraw from one group, therefore it is imperative to keep attrition bias to a minimum (Grove et al., 2013). Yet, public health intervention research often occurs within the context of existing health services in which there are a variety of reasons for which subjects do not return; this in turn may lead to intervention research with important findings not considered due to attrition rates (Amico, 2009). As well, there is a necessary time lag between the prenatal intervention and the postnatal measures of outcomes in the current review, which may account for the higher attrition rates. Attrition is complex and it has been suggested researchers develop further methods to assess attrition beyond a simple calculation of percentage (Amico, 2009). The current literature

on prenatal education interventions either report attrition with a percentage, or do not report a percentage, but rather leave it to the reader to calculate, therefore a simple percentage calculation was all that was available for this current review. The graduate student and supervisor reviewers calculated attrition in each study to maintain consistency in the calculation method. As more detailed investigations into attrition are not currently found in the research studies, a less rigorous view of the attrition percentage was utilized in the current systematic review. A decision was made to change the criteria for the attrition rate to ≤ 15% (pass), 16-35% moderate, ≥ 36% fail, while recognizing this may introduce bias.

Detection bias was considered by assessing three areas of data collection: (a) how well the data collection was described, (b) whether the measures were pretested to indicate their reliability and validity, and (c) whether the assessors of the measures were blinded. A pass indicated two of the three categories were true. A *well described* study indicated the study gave a clear description of the data collection and the measuring tools, and reported on the reliability and validity of the tools. Some studies did not report the reliability and validity but did use well known tools in which the reality and validity is known to be widely reported, therefore a list of well-known measuring tools was included in the validity tool dictionary. The *pretested* category included studies in which there was a previous pilot study or the tools were used in a similar population by the current author or a different author. Lastly, detection bias, which is improved by *blinding* the data assessors to which group a subject belongs to, was also assessed (Higgins & Green, 2011).

Statistical analysis was adapted to include both bivariate and multivariate analysis in the *pass* category in the validity tool. The intent of the current systematic review is to understand the effectiveness of prenatal education classes as an intervention in terms of the five outcomes. Many of the studies examined multiple outcomes, with multiple tools using bivariate research to examine the effect of the intervention on a particular outcome, and multivariate research which goes a step further to also examine the relationship between various dependant variables. For the purposes of the current systematic review it is of less value to know if there is a relationship between the dependant variables. As such bivariate research satisfactorily answers the research question. This led to a revision of the tool in which multivariate/bivariate is categorized as *strong*, descriptive/other as *moderate*, and not reported as *fail*.

Outcome reporting is recommended to assess whether a study is reporting all outcomes measured (Higgins & Green, 2011). There is a potential for a researcher to not publish negative

results (Grove et al., 2013). The pass criteria included studies in which all outcomes of interest were reported completely in the findings, and the moderate criteria included studies in which the study's intent had changed or some outcomes were not reported.

The validity tool examined each criterion, leading to a final categorization based on the number of pass, moderate, and fail criteria within each particular study. Final categories included an overall rating of strong, moderate, weak, and poor. The number of studies following the relevance tool was large, therefore a decision was made to focus on the most recent findings, with the review focused on the 15 year period of 2004-2018, rather than the original 20 years, which now excluded 8 studies from the review. The validity tool was applied to the remaining 61 studies, finding 34 studies in the strong and moderate groups and 27 in the weak and poor groups. The strong and moderate quality studies were included in the review whereas the weak and poor studies were excluded. A review of the strong and moderate studies found there were two general categories of subjects namely, women defined as at risk of a maternal mental health concern and women in which a risk was not identified prior to inclusion in the study, and therefore more representative of the general population. There also were two categories of interventions, those which contained an aspect of childbirth education, and those which did not. The studies of prenatal education classes without a childbirth component were, most often, prenatal education interventions with a mental health focus geared towards women defined as at risk for maternal mental health concerns. A decision was made to redefine the relevance criteria to focus on one population and one type of class: general samples of women attending prenatal education classes which included content on childbirth. This decision was made for two key reasons, firstly to include the type of prenatal education classes which are most often attended by women in Canada, and secondly, because of the difficulty in meaningfully synthesizing two different populations and interventions in a single review. The redefined relevance criteria were applied to the three studies found in the updated July 2019 search which met the original relevance criteria. As the three studies focused on high risk populations or education without a childbirth component, they are not included in this systematic review. In summary, the current systematic review examined prenatal education classes with a childbirth component targeted at a general population of pregnant women and conducted between 2004 and 2019. As such, 15 studies are included in the current review.

3.5 Study Assumptions

There are certain assumptions made in the current systematic review. Firstly, the cultural and gender label of 'mother' assumes that mothers are women and female, as well as the mother on whom data was collected is the birthing mother. It was expected, based on previous literature reviews, there would be little information in the prenatal education effectiveness research on Lesbian Gay Bisexual Transgender/Transsexual Queer Two Spirit (LGBTQ2S) parents. Secondly there are assumptions of the global value of socialization and infant care to mothers. It is assumed that mothers, as humans, are inherently social beings, therefore mothers have a desire for social support and wish to be competent caregivers for their infants to propagate humanity. Thirdly, there are cultural assumptions as to the importance of structured prenatal education in a class format. While it is known from the literature structured prenatal education classes have become a part of the cultural expectation of pregnancy, the literature supporting this is from a Western perspective. Lastly, it is assumed program differentiation is unlikely to be assessed by researchers as pregnant women are known to seek information from a variety of sources; it is doubtful women will receive information on prenatal education topics solely from prenatal education classes.

3.6 Data Extraction

Data extraction allows the reviewers to collect relevant information from individual research studies included in the review as a means to prepare for data synthesis (Forbes, 2003). In essence, the purpose of data extraction is to collect relevant information to answer the research question (Aromataris & Pearson, 2014). The data extraction tool included general information and specific items of interest needed for data synthesis (Forbes, 2003).

Prenatal education is a complex intervention; therefore, details affecting the integrity of the intervention are important because the success or failure of the intervention is influenced by the delivery of the intervention and other contextual factors (Higgins & Greene, 2011). Dane and Schneider (1998) suggested effectiveness research, as it occurs often in natural conditions, is at greater risk of inconsistency in program delivery. Dane and Schneider's literature review on program integrity in prevention research found decreased program integrity is correlated with poorer outcomes in prevention intervention research. In the past, health prevention research has not consistently addressed program integrity; therefore, it is important to consider whether current research is now examining program integrity (Dane & Schneider, 1998). Higgins and Green (2011) suggested an examination based on the five aspects of program integrity outlined

by Dane and Schneider (1998): (a) adherence of program delivery to its true intent, (b) exposure of the participants to the class, (c) quality of delivery, (d) participant responsiveness, and (e) program differentiation (an assessment of whether the participants received only the intervention). The data extraction tool included an assessment of certain aspects of program integrity including adherence to program delivery and exposure (class length). The quality of delivery was considered by assessing the facilitators' professional qualifications. Participant responsiveness was not addressed as no qualitative aspects such as enthusiasm of facilitator or participants were reported in any studies. Program differentiation was not included as discussed earlier.

In systematic reviews, synthesis of a large amount of data is assisted by using an organized and systematic tool (Pinch, 1995). A data extraction tool adapted from the Pinch table and Cochrane Handbook for Systematic Reviews was used to organize the data in the present review (Higgins & Green, 2011; Pinch, 1995). The data extraction tool included the author; year of publication; the country of origin; research design; sample characteristics (age, parity, other characteristics); sample size; characteristics of the group class intervention (type of intervention, content, length, setting, adherence, facilitator credentials); type of control group; time and type of measures; statistical analysis; and results. Secondary tables organized by outcomes and results helped illustrate the themes found among the results. See Appendix D for Table D.1 Data Extraction Tool.

3.7 Data Synthesis

The purpose of data synthesis is to summarize the data collected to answer the research question and to describe any differences and similarities between the group of studies (Aromataris & Pearson, 2014; Forbes, 2003). Pinch (1995) suggested content analysis strategies facilitate the synthesis of data. When the data extraction tool is complete, synthesis proceeds as a new product is derived from the collected synthesis of the data (Pinch, 1995). The data extraction tools described above organized and categorized the data. The current systematic review synthesized the populations, interventions, outcomes, and quality of studies found in the data extraction tool (Forbes, 2003). The data was analyzed based on the organizational headings of the data extraction tool and outcomes tables to observe themes of similarities and differences. The findings indicate there are a number of concepts related to each outcome, therefore the data was analyzed for similar themes with subgroups developed based on the themed concepts and

similarities in measuring tools. When a heterogeneous sample is obtained, a descriptive synthesis is the most appropriate and useful method of synthesis (Forbes, 2003). When a homogenous sample is obtained, a meta-analysis is appropriate (Aromataris & Pearson, 2014; Forbes, 2003). The studies included in the current systematic review are heterogenous, therefore the data synthesis presented is a narrative synthesis.

3.8 Ethics

The current systematic review analyzed data from existing studies that each obtained ethical approval for conduct of their research; therefore, this research project is exempt from ethical approval by the University of Saskatchewan Research Ethics Review Board (Canadian Institutes of Health Research (CIHR), Natural Sciences and Engineering Research Council of Canada, & Social Sciences and Humanities Research Council of Canada, 2010). This exemption from ethics approval was reinforced by a discussion with the Research Services and Ethics Office of the University of Saskatchewan (Beryl Radcliffe, personal communication, May 19, 2017) and followed up with written communication referencing the rationale for exclusion in a document from the CIHR et al. (2010).

CHAPTER FOUR

FINDINGS

This chapter will present the findings of the current systematic review. A general summary of the included studies will begin the chapter, followed by a narrative synthesis of the studies organized by prenatal education outcome. Please see Appendix D Table D.1 for summaries of each study.

4.1 Summary of the Findings

4.1.1 General Characteristics

The current review includes 15 studies, most of which use a RCT approach. The studies were conducted in a variety of countries around the world. Research conducted in the United States (*n*=3) and China/Hong Kong (*n*=4) comprised most of the included studies, with a smaller number of studies from the United Kingdom (*n*=1), Denmark (*n*=2), Australia (*n*=2), Turkey (*n*=2) and Iran (*n*=1). Most studies occurred in western and non-western high resource countries and all studies occurred in Urban areas. Overall, the studies demonstrated similarity in parity and age of subjects, with 14 out of 15 samples consisting of primiparous women 18-35 years of age (see Table 4.1). The vast majority of the sample (89%) in the sole study which included multiparous women were primiparous (Koushede et al, 2017). Sample sizes ranged between 29-1348 participants, with most studies having 100-300 participants (see Table 4.2). The qualifications of those providing prenatal education was diverse, although most classes were provided by an educator with a professional background in the health sciences (See Table 4.3). The prenatal classes under study were all located in urban areas in a hospital, clinic, or university setting. Adherence to program delivery was not addressed in the majority of the included studies. One out of 15 studies reported on adherence, finding adherence averaged 98% (Daley-McCoy et al., 2015). This study intended to examine program fidelity, whereas the remaining 14 studies did not.

4.1.2 Study Design

Of the 15 studies in the current review, 9 utilized a randomized controlled trial (RCT) approach and 6 a matched cohort approach via design or statistical analysis. Of the six matched

cohort style studies, three described themselves as RCTs, with randomization occurring at the level of the class or site rather than the subject. Understandably, this type of randomization is not as robust as randomization of individual participants. The goal of random sampling is to increase the likelihood extraneous variables are more evenly distributed between groups, aiding in the equality of the groups (Grove et al., 2013).

Table 4.1

Sample Age of Included Studies

Age	Study
18+	Arcamone, 2005
	Daley-McCoy et al., 2015
	Koushede et al., 2017
	Maimburg & Væth, 2015
	Ngai et al., 2009
	Schachman et al., 2004
18-35	Bahrami et al., 2013
<35	Gao et al., 2010
	Gao et al., 2012
Old puerperal age excluded (undefined)	Mao et al., 2012
Not reported	Duncan et al., 2017
	Matthey et al., 2004
	Serçekuş & Mete, 2010
	Serçekuş & Başkale, 2016
	Svensson et al., 2009

Table 4.2

Sample Size of Included Studies

Sample Size	Study
<100	Daley-McCoy et al., 2015
	Duncan et al., 2017
	Serçekuş & Başkale, 2016
100-300	Arcamone, 2005
	Bahrami et al., 2013
	Gao et al., 2010
	Gao et al., 2012
	Mao et al., 2012
	Matthey et al., 2004
	Ngai et al., 2009
	Schachman et al., 2004
	Serçekuş & Mete, 2010
	Svensson et al., 2009
>1000	Koushede et al., 2017
	Maimburg & Væth, 2015

Table 4.3

Credentials of Prenatal Educators

Credentials	Study
Midwife	Bahrami et al., 2013
	Daley-McCoy et al., 2015
	Gao et al., 2010
	Gao et al., 2012
	Koushede et al., 2017
	Maimburg & Væth, 2015
	Ngai et al., 2009
Clinical psychologist	Daley-McCoy et al., 2015
	Matthey et al., 2004
Registered nurse	Serçekuş & Mete, 2010
Obstetrician	Mao et al., 2012
Certified childbirth educator	Duncan et al., 2017
Childbirth educator, undefined	Svensson et al., 2009
Physiotherapist	Matthey et al., 2004
Health visitor, undefined	Koushede et al., 2017
Parent educator, undefined	Matthey et al., 2004
Social worker or occupational therapist	Matthey et al., 2004
Not reported	Arcamone, 2005
	Serçekuş & Başkale, 2016

Matched cohort design was considered important to include in the current systematic review. While RCTs are the gold standard for study design, consideration should be given to including study designs beyond RCTs (Victora et al., 2004). RCTs demonstrate risks to internal and external validity through issues such as long causal pathways to complete an intervention, generalizability, and dose of intervention (Victora et al., 2004). Public heath intervention research must consider the limitations inherent in randomizing study subjects living their lives in a community as individual behavioural factors do impact attendance of the intervention (Grove et al., 2013; Shelton, 2014; Victora et al., 2004). The inclusion of quasi-experimental designs in systematic reviews also aids in identifying broader patterns in the research literature (Shelton, 2014). For these reasons, this systemic review has included RCT and matched cohort designs.

Most studies utilized intention to treat analysis and one study (Bahrami et al., 2013) had 100% data return (n=11). Intention to treat refers to the principal of utilizing statistical analysis to impute data for participants whose data is missing and keeping these participants within the appropriate group (Grove et al., 2013). Intention to treat is important to public health intervention research as it is expected some participants will not continue with the study, due to a variety of

life circumstances. When intention to treat is not used there is a risk the groups will no longer demonstrate equality.

4.1.3 Interventions

The current review focused on prenatal class interventions delivered during pregnancy that included education about the birthing process. The studies included for this analysis demonstrated variability in the nature of the intervention and control groups. See Table 4.4 for a summary of the type of interventions and controls.

Table 4.4

Comparison of Interventions and Controls

Intervention Group	Control Group	Study
Add-on to standard prenatal class	The same standard prenatal class	Daley-McCoy et al., 2015 Gao et al., 2010 Gao et al., 2012 Matthey et al., 2004 Ngai et al., 2009 Schachman et al., 2004
New design	The standard prenatal class in that locale	Koushede et al., 2017 Mao et al., 2012 Svensson et al., 2009
New design	A list of local standard prenatal classes of comparable length and quality	Duncan et al., 2017
Prenatal class attenders	Non-attenders/usual prenatal care	Arcamone, 2005 Bahrami et al., 2013 Maimburg & Væth, 2015 Serçekuş & Mete, 2010 Serçekuş & Başkale, 2016

Interventions included content *add-ons* to existing standard prenatal classes, *newly designed* classes, or *standard prenatal education* classes. Control groups were comprised of *standard prenatal education classes, usual prenatal care* (which did not involve prenatal education classes, such as usual care provided by clinics), and *nonattendance* without explanation as to whether the control group received usual clinic care. In particular, Bahrami et al.'s (2013) study of a newly designed course was unclear in that it stated the control group did not attend prenatal education classes and later stated the control group enrolled in routine prenatal care classes.

Standard prenatal education involved educational topics typically found in prenatal education classes, such as information on pregnancy, labour and birth, coping with pain, infant

care, and the postpartum period. Add-ons and new designs tended to focus on psychosocial content of varying length. While the total length of prenatal classes was most often over 10 hours (range 4-18 hours), the length of the specific added content varied. Add-on content ranged from one session of the class series of undefined length, to every session of the class series for a total of four hours of additional content. Newly designed classes tended to incorporate psychosocial content throughout the series. See Table 4.5 for a summary of the type of intervention and duration of psychosocial content.

The studies included in the current systematic review all pertain to prenatal education, but the form and duration of that education demonstrates some variability, as do the control groups and statistical methods, making it impossible to perform a meta-analysis of the statistical findings. A meta-analysis is not appropriate when there is variation in the comparisons of treatments and/or control groups (Higgins & Green, 2011).

Table 4.5

Duration of Psychosocial Interventions

Type of intervention	Duration of intervention	Total length of Series	Author
New design	Threaded throughout the series	18 hours	Duncan et al., 2017
		14 hours	Svensson et al., 2009
		7.5 hours	Koushede et al., 2017
		6 hours	Mao et al., 2012
Add-on	4-hours over 4 classes	16 hours	Schachman et al., 2004
	3-hours over 3 classes	15 hours	Ngai et al., 2009
	1-2 hours over 1 class	12 hours	Daley-McCoy et al., 2015
	Undefined length in 1 class	12+ hours	Matthey et al., 2004
	2-hours over 2 classes	6 hours	Gao et al., 2010
	3-hours over 2 classes	6 hours	Gao et al., 2012

4.2 Individual Study Outcomes

The results of the current review are organized according to the following outcomes: (a) maternal mental health, (b) social support, (c) transition to motherhood, and (d) infant care. Sexual health outcomes are an objective of the systematic review; however, as no studies measuring or reporting on sexual health were located during the search, no results are reported. The first three outcomes have been divided into sub-outcomes to assist in organizing the findings of the included studies according to narrower focus areas (see Table 4.6). Most studies examined more than one outcome; therefore, the study design will be described in greater detail prior to the

discussion of the first outcome in which it appears, followed by a briefer description in subsequent outcomes of interest.

Table 4.6

Summary of Outcomes and Sub-outcomes

Outcomes	Sub-outcomes
Maternal mental health	Depression
	Other mental health concerns
	Mental well-being
	Internal resources (confidence, other internal resources)
Social support	Quality of relationships
	Instrumental support
	Support from others
	Other concepts of social support
Transition to motherhood	Satisfaction with motherhood and with life
	Self-efficacy
Infant care	No sub-outcomes

There were many different tools used to measure the outcomes. Most tools measure one outcome, although an individual outcome may have many tools which measure that particular concept. Two tools utilized subscales which measure different outcomes; as such the subscales are reported separately in the relevant outcome. The WHO Quality of Life Scale (WHOQOL-BREF) uses four subscales with no total score (Bahrami et al., 2013); two subscales are relevant and reported in the appropriate outcome, and two are not relevant to the current review. The Postpartum Self-Evaluation Questionnaire (PPSEQ) is composed of seven subscales and a total score; the total score reflects maternal role competence (Schachman et al. 2004; Serçekuş & Mete, 2010). Three studies used the PPSEQ, with two reporting the results of all seven scales and the total score (Schachman et al., 2004; Serçekuş and Mete, 2010) and one reporting only three of the subscales (Arcamone, 2005). While the total score is reflective of maternal role competence, which fits with the transition to motherhood outcome, the subscales have a better fit for various outcomes utilized in the current review. To allow for a more detailed examination of various outcomes which all contribute to maternal role competence, the current systematic review will examine the subscales of the PPSEQ rather than total scores. Six of the seven sub-outcomes in the PPSEQ are of interest to the current systematic review, whereas the seventh outcome pertaining to labour and delivery is not relevant.

4.3 Maternal Mental Health

Maternal mental health outcomes are examined in 14 out of the 15 studies. Since multiple mental health concepts were assessed using a variety of tools, maternal mental health is subdivided into four sub-outcomes. Many of the measures describe mental health concerns, such as depression, worry, stress, and distress. The majority of the studies measure depression, therefore depression symptoms and diagnosis will be considered as the first sub-outcome, while other types of mental health concerns are addressed as a separate second sub-outcome. There are also studies which examined mental health from a positive perspective, looking at measures of well-being in the postpartum period, resulting in the third sub-outcome of well-being. A final sub-outcome encompasses studies that assessed internal resources related to mental health. In summary, the discussion on maternal mental health includes the sub-outcomes of depression, other concerns, well-being, and internal resources.

Daley-McCoy et al. (2015) compared the standard NHS prenatal education classes to the intervention group (n=26) taking the same classes plus an additional one-two hours of education on realistic expectations of parenting and effective couple communication following one class. A cluster RCT was utilized, with randomization occurring at the class level rather than the subject level. The Edinburgh Postpartum Depression Screen (EPDS) was measured at baseline and six-weeks postpartum. The intervention did not change depressive symptoms over time from baseline to six-weeks postpartum compared to the standard prenatal classes. The difference in significance was not measured for the six-week postpartum time period alone.

Gao et al. (2010) and Gao et al. (2012) reported on the same research data with the former focusing on the six-week postpartum results and the latter on the three-month postpartum results using the EPDS. Using a RCT design, the control classes (n=88) were comprised of two-90-minute birth and infant care classes. The intervention classes (n=87) consisted of the same control prenatal classes, followed by a short break, then an additional session after each class and one follow up phone call within two-weeks of birth. The intervention length is not clear as Gao et al. (2010) reported the additional content comprised 2-90 minute sessions following each standard class, whereas Gao et al. (2012) indicated the additional sessions were each two hours in length. The intervention content comprised interpersonal psychotherapy techniques to address the transition to motherhood, communication, infant gender, PPD, social support, interpersonal conflict resolution, and traditional Chinese post birth practices. The intervention had a significant effect, with a decrease in depressive symptoms at six-weeks (Gao et al. 2010) and three-months

postpartum (Gao et al., 2012) as compared to standard prenatal education classes. The intervention also significantly decreased depression across time when measured from baseline to six-weeks postpartum (Gao et al., 2010) and when measured from baseline to six-weeks postpartum to three-months postpartum (Gao et al., 2012). Gao et al. (2010) and Gao et al.'s (2012) research also examined maternal well-being with the General Health Questionnaire at six-weeks postpartum (Gao et al. 2010) and three-months postpartum (Gao et al. 2012). The intervention was found to improve psychological well-being at six-weeks postpartum and across time from baseline to six-weeks, as well as baseline to six-weeks to three-months when compared to standard prenatal education classes (Gao et al., 2010; Gao et al., 2012).

Matthey et al.'s (2004) RCT compared an intervention to two controls. One control group (*n*=74) received the standard prenatal class series. A nonspecific control (*n*=59) received the same content plus one added session of unknown length on infant development and play with a postintervention-prenatal and postpartum handout on the same topic. No coping or psychosocial information was provided. The intervention group (*n*=66) attended the same standard prenatal education classes plus one added session of unknown length on empathy including couples understanding of the other's experience, couple behaviour, strategies to cope with stress, lack of confidence, and a postpartum mail out on coping. This study performed statistical analysis with and without intention to treat analysis, finding the results to be the same for all measures, except when analyzing one finding, which will be described further in the transition to parenting outcome (Matthey et al., 2004). Matthey et al.'s (2004) study also examined distress with the Profile of Mood State (POMS) measured at six-weeks postpartum and six months postpartum.

The EPDS was used at baseline, six-weeks, and six-months postpartum with analysis of the sample as a whole and a sub-analysis based on a baseline assessment of low, medium, or high self-esteem. The intervention demonstrated significant findings for improved depressive symptoms at six-weeks postpartum but only for women who had low self-esteem. There was no significant finding for depression diagnosis at six-weeks or six-months postpartum for any women. Additionally, Matthey et al. (2004) looked at the score cut-off of likely depression (12/13 major depression, 9/10 minor or major depression) for high levels of postpartum depressive symptoms on the EPDS tool to find the intervention did not change for women with low self-esteem. Medium and high self-esteem group EPDS cut-off scores were not reported.

Ngai et al. (2009) described their intervention as a RCT in which classes were randomized, therefore this study was classified as a matched cohort study. The control group (*n*=44) attended the standard prenatal education series. The intervention group (*n*=79) attended the same standard series plus an additional hour of learned resourcefulness training at the end of each standard class. The intervention included knowledge on expected emotional changes in the perinatal period, cognitive restructuring, problem solving strategies, goal setting, practice of learned resourcefulness skills, and infant care decision making. Depression was assessed with the EDPS, indicating the intervention did significantly decrease depressive symptoms over time from baseline to post-intervention to six-weeks postpartum to six-months postpartum. Individual time points were not compared. Ngai also examined learned resourcefulness, finding a significant increase across the same time points.

Mao et al.'s (2012) RCT compared a newly designed prenatal class series with a focus on emotional self management (*n*=113) to the standard prenatal education classes (*n*=108). The intervention was the same length as the control, four 90-minute classes, with a homework component and one individual counselling session, and incorporated emotional self management throughout the entire length of the class series. This program included Chinese delivery culture, problem solving, positive communication, relaxation exercises, cognitive restructuring, and self-confidence. The EPDS was measured, finding the intervention significantly decreased depressive symptoms at six-weeks postpartum. Mao et al. (2012) also found women in the intervention group had a significantly decreased likelihood of a depression diagnosis at six-weeks postpartum compared to standard prenatal education classes, as measured by a structured diagnostic interview.

Duncan et al.'s (2017) newly designed prenatal class series was a pilot RCT stratified for pre-class intention of epidural use. The main focus of the study was the effect of mindfulness on fear and pain in childbirth, with secondary outcomes of PPD symptoms and the purposeful use of mindfulness of interest to the current review. The intervention group (*n*=15) consisted of an 18-hour weekend course with a focus on mindfulness as a method of coping with pain and fear in childbirth, and developing support and personalized coping strategies. The intervention was incorporated throughout the full course. The control group (*n*=14) chose from a list of standard prenatal education courses in this location, preselected for similar length and quality. The Center for Epidemiologic Studies-Depression Scale (CES-D) tool was utilized to measure depressive

symptoms at six-weeks postpartum. The intervention was effective in decreasing depression symptoms across time as measured by comparison of average scores between intervention and control groups at baseline to postintervention to six-weeks postpartum. Individual time points were not analyzed for significance.

Koushede et al. (2017) examined a new small class prenatal series, as the standard prenatal education in this location consisted of a large 250-person group format. This RCT was stratified for parity and vulnerability of psychosocial issues. The intervention group (*n*=662) consisted of small groups of six-eight women attending three two and a half hour classes plus one additional class at five-weeks postpartum and a patient network website to supplement the intervention classes. The intervention class was of considerably longer length than the control large group 4-hour format. The intervention had a psychosocial focus with topics including various types of social support, including an aim to create relationships among class participants, parenting alliance (supporting couples, couple communication), cognitive coping (self-efficacy, problem solving, emotional regulation, expected parenting challenges), and parenting skills (information, healthy newborns). Control and intervention participants were allowed to attend concomitant parenting or birth education classes and statistical analysis examined this variable. The EPDS was used to measure depressive symptoms at nine-weeks postpartum, finding no significant difference in the percentage of women with depressive symptoms compared to a large control group. Koushede et al. (2017) also examined stress as measured by the Swedish Parenthood Stress Scale (SPSQ) and the Perceived Stress Scale (PSS), at nine-weeks postpartum and six-months postpartum, as well as a total across time score of measures taken at 37-weeks gestation, nine-weeks postpartum, and six-months postpartum. The intervention demonstrated no change in parenting stress at either time point or across time, and a small but statistically significant decrease in perceived stress at six-weeks and across time, but not at nine-weeks.

Maimburg & Væth (2015) conducted a RCT looking at prenatal class education (*n*=543) compared to usual prenatal care (*n*=526) as no prenatal education classes were being offered in the area. The intervention consisted of three classes on birth, newborn care, and transition to motherhood. The EPDS was measured at six-weeks postpartum, finding prenatal education classes did not change the odds of PPD compared to usual prenatal care.

Svensson et al.'s (2009) RCT of a newly designed prenatal class series (*n*=91) was compared to standard prenatal education classes *(n*=79). The new class design included new

content and instructional techniques such as parenting information and activities, new parents as guest speakers, and a bath demo of an actual infant. The intervention and control class series were the same number of hours and both included a reunion class during the postnatal period. The study examined worry as measured by the Cambridge Worry Scale at eight-weeks postpartum, finding the intervention did not effect a significant difference compared to standard prenatal education classes.

Bahrami et al.'s (2013) RCT compared a 12-hour prenatal education class (*n*=80) to nonattendance (*n*=80), as prenatal education was not yet offered in this area in Iran. The prenatal education class content included pregnancy, childbirth, postpartum care, infant feeding, newborn care, and family planning, with one counselling session to answer questions. The description of the counselling session does not specify whether it was group or individual counselling. Mental well-being was measured with the 'psychological health' subscale of the WHOQOL-BREF between six to eight-weeks postpartum and one year postpartum, finding a significant increase in the quality of psychological health at both time periods as compared to women who did not receive prenatal education classes.

Arcamone (2005), Serçekuş and Mete (2010) and Schachman et al. (2004) all used the same measuring tool, the 'confidence in coping with the tasks of motherhood' subscale of the PPSEQ. Arcamone compared two intervention groups to the control. The intervention groups comprised women attending the standard prenatal education series (8-10 hours on childbirth, coping with pain, and postpartum care) and the standard infant care class (one-two hours on newborn care and coping with a newborn) (*n*=52) offered in this location, and women who attended the prenatal education series but not the infant care class (*n*=53). The control group were nonattenders (*n*=53). The reason women did not attend was not reported (Arcamone, 2005). The convenience sample involved non-equivalent groups, although statistical analysis controlled for confounders, finding the groups were not significantly different. The intervention did not demonstrate any significant difference in confidence between any of the three groups at two-weeks postpartum.

Schachman et al.'s (2004) RCT compared standard prenatal classes (*n*=47) to an additional component on identification and development of internal and external resources as the intervention (*n*=44). Internal resources included positive feedback, building confidence, and self-esteem. External resources consisted of communication techniques, developing personal

networks, friend support, and local resources. The intervention group received 16 hours of prenatal education, with three hours per class of the standard content and one additional hour each class of the intervention material. The intervention demonstrated significantly improved confidence at six-weeks postpartum compared to standard prenatal education.

Serçekuş and Mete's (2010) non-random matched cohort design compared two intervention groups, 14 hours of group prenatal education classes (*n*=40) and individual prenatal education (*n*=40) to nonattenders (*n*=38). The individual prenatal education results are not within the scope of the current review and are not reported. The intervention group content included standard prenatal education content. The prenatal education class did not have a significant effect on confidence in the motherhood role at six-weeks postpartum compared to nonattenders.

4.3.1 Depression

There are nine studies which examined depression, with nine describing depressive symptoms and two also describing the diagnosis of depression. See Table 4.7 for a summary of the findings on depression. The tools used to assess depressive symptoms are all self-report measures, whereas diagnostic tools are based on structured interviews. To assess the effectiveness of the intervention, a comparison is made clearer when there is similarity in measuring tool, therefore depressive symptoms will be described separately. As well, in practice, the tools are used for different purposes, therefore it may be of interest to readers to view the outcomes separately. The EPDS is a readily available tool used by physicians, registered nurses, and other health care professionals as a self-report measure to help identify women at risk for PPD. Depression diagnosis was examined in two studies; Matthey et al. (2004) used the Diagnostic Interview Schedule, and Mao et al. (2012) used the SCID-TR Axis I disorders, both of which are structured interviews based on the DSM-IV diagnostic criteria.

The nine studies measuring depression utilized two different tools. Eight of the studies utilized the EPDS to assess depressive symptoms (Daley-McCoy et al., 2015; Gao et al., 2010; Gao et al., 2012; Koushede et al., 2017; Maimburg & Væth, 2015; Mao et al., 2012; Matthey et al., 2004; Ngai et al.; 2009). The intent of the EPDS is as a screening tool for depressive symptoms, rather than as a diagnostic tool (Cox, Holden & Sagovsky, 1987). It is the most commonly used screening tool for PPD (Gaynes et al., 2005). Of the studies utilizing the EPDS, most described the tool as a measure of depressive symptomatology, while one described the tool as a measure of psychological distress (Daley-McCoy et al., 2015). Duncan et al. (2017) utilized

the CES-D as a measure of depressive symptoms. The CES-D was designed as a measure of depressive symptomatology for the general population (Radloff, 1977). It is a well-known tool which has been used in multiple populations and is known to be a valid measure of depressive symptoms in pregnancy (Canaday, 2009).

Table 4.7

Maternal Mental Health Depression Outcomes

Author	Significant findings	Nonsignificant findings
Daley-McCoy et al. 2015	None	No difference in psychological distress (EPDS) over time (baseline-6 wks PP)
Duncan et al. 2017	Decrease in depression symptoms across time (baseline, postintervention/prenatal, 6 wks PP)	None
Gao et al. 2010	Decreased depressive symptoms at 6 wks PP Decreased depressive symptoms across time (baseline-6 wks)	None
Gao et al. 2012	Decreased depressive symptoms at 3 mo PP Decreased depressive symptoms across time (baseline-6 wks PP-3 mo PP)	None
Koushede et al. 2017	None	No change in percentage of women with depressive symptoms at 9 wks PP
Maimburg & Væth 2015	None	No change in the odds of PPD at 6 wks PP
Mao et al. 2012	Decreased depression symptoms at 6 wks PP Decreased likelihood of a PPD diagnosis at 6 wks PP	None
Matthey et al. 2004	Decreased depressive symptoms only for women with low self-esteem at 6 wks PP	No change in depressive symptoms, at 6wk PP for women with high or medium self-esteem or at 6 mo PP for any women No change in diagnosis of depression or depression-anxiety diagnosis at 6 wks and 6 mo PP for any women No influence on the EPDS cut off categories at 6 wks PP for women with low self-esteem. medium and high group not reported
Ngai et al. 2009	Fewer depressive symptoms over time (baseline-post- 6 wks PP-6 mo PP)	None

Prenatal education classes with additional content or new design show variable results of effectiveness for depressive symptoms. Six studies reported a significant positive finding at six-weeks and three-months postpartum, as well as across time measures (Duncan et al., 2017; Gao et al., 2010; Gao et al., 2012; Mao et al., 2012; Matthey et al., 2004; Ngai et al., 2009). Four studies reported nonsignificant findings at six-weeks, nine-weeks, and six-months postpartum, as well as across time measures (Daley-McCoy et al., 2015; Koushede et al., 2017; Maimburg & Væth, 2015; Matthey et al., 2004). It should be noted Matthey et al. (2004) found both significant and nonsignificant results for this outcome, with a significant finding for the low self-esteem subpopulation only.

Successful interventions included newly designed classes with a focus on mindfulness (Duncan et al., 2017) and emotional self-management (Mao et al., 2012). Other successful interventions included add-on's to standard classes such as an additional three or four hours on interpersonal psychotherapy for childbirth (Gao et al., 2010; Gao et al., 2012) and an additional three hours on learned resourcefulness for childbirth (Ngai et al., 2009). Matthey et al. (2004), featured one additional session on empathy and found a significant positive outcome only for the subgroup of low self-esteem women.

It is important to note of the above statistically significant results, two studies only examined across time measures (Duncan et al., 2017; Ngai et al., 2009) and three others (Gao et al., 2010; Gao et al., 2012) measured both individual and across time measures. Across time statistics provide a comparison of change across time between the control and intervention group, rather than providing a comparison at each individual time point. Across time measures alone are not as robust as comparisons at individual time points, since it is not possible to tell when the effect occurred. This is particularly true when the study has more than two measuring points and when a measuring point is included from the prenatal period, as it is not possible to glean whether the significance occurred during pregnancy or postpartum. Although three studies demonstrate prenatal education classes decrease depressive symptoms over time, it is not possible to tell where in time the significance of this change occurred.

Four studies found prenatal classes had no significant effect on depressive symptoms. One compared standard prenatal education content to usual prenatal care (Maimburg & Væth, 2015). Koushede et al.'s (2017) newly designed series compared small to large group prenatal classes and found no significant effect on depressive symptoms. Two add-on interventions

demonstrated no significance: Daley-McCoy et al.'s (2015) one added session on realistic expectations of parenthood and effective communication skills and Matthey et al.'s (2004) one added session on the topic of empathy had no significant effect for the group as a whole, or for subpopulations of women with medium to high self-esteem. Add-on's of greater length, as described above, demonstrated a positive influence on depressive symptoms.

In addition, two of the above studies also examined PPD diagnosis, with differing results. Mao et al. (2012) found newly designed emotional self-management prenatal education classes decreased the likelihood of a PPD diagnosis at six-weeks. Matthey et al.'s (2004) one session add-on related to empathy found no difference in depression diagnosis at six-weeks or six-months, regardless of self-esteem level.

In summary, a comparison of studies of the sub-outcome of depression appear to show a trend towards increased effectiveness when the intervention is a focused new design of a topic related to mental health or additional content of a psychosocial nature of at least three hours in length when compared to standard prenatal education classes. Interventions of one session added to standard classes were not found to be effective in decreasing depressive symptoms other than for a subgroup of women with low self-esteem and did not impact PPD diagnosis for any women. Interventions comparing attenders of prenatal education classes to usual prenatal care were not significant for this outcome, nor was an intervention comparing small class size to large class size.

4.3.2 Other Mental Health Concerns

While depression was by far the most common type of mental health concern found in the studies of the current systematic review, three studies examined other concerns such as the concepts of stress (Koushede et al., 2017), distress (Matthey et al., 2004), and worry (Svennson et al., 2009). See Table 4.8 for a summary of the findings.

To summarize, prenatal education classes of new design or added content did not demonstrate a clear benefit for the maternal mental health concerns of worry, stress, and distress. The small group intervention did lead to a small but statistically significant difference in perceived stress at six-months postpartum (Koushede et al., 2017). The intervention was also significant across time from 37-weeks gestation to nine-weeks postpartum to six-months postpartum, but the authors determined the across time measure was not clinically relevant (Koushede et al. 2017). The length and style of the three interventions are variable, with

Koushede et al. (2017) and Svensson et al. (2009) assessing new, albeit different, designs. Koushede et al. (2017) examined small group with psychosocial content versus large group instruction with standard birth and breastfeeding content. Svensson et al.'s (2009) intervention increased parenting content throughout the series. The Matthey et al. (2004) intervention was a one session empathy add-on to standard classes. The interventions varied in total length, with Koushede et al.'s (2017) four hours in length, Svennson et al.'s 14-16 hours in length, and Matthey et al.'s (2004) 12 hours. Prenatal education classes appear to have little effect on the mental health concerns of parenting stress, worry or distress, with only a small but significant effect on perceived stress at six-months postpartum when delivered in a small group format.

Table 4.8

Maternal Mental Health Other Concerns Outcomes

Author	Significant findings	Nonsignificant findings
Koushede et al. 2017	Slight decrease in perceived stress at 6 mo PP	No change in perceived stress at 9 wks PP
	While the intervention group demonstrated a slight statistical difference in perceived stress over time (37 wks gestation, 9 wks PP and 6 mo postpartum), it is not a clinically relevant difference	No change in parenting stress at 9 wks and 6 mo PP Intervention group had no difference in parenting stress across time (9 wks PP-6 mo PP) as compared to control. (SPSQ)
Matthey et al. 2004	None	No change in distress at 6 wks and 6 mo PP in any women
Svensson et al. 2009	None	No change in worry at 8 wks PP

4.3.3 Mental Well-Being

Mental well-being includes any measure of positive attributes of mental health. Three studies examined mental well-being, including psychological health (Bahrami et al., 2013) and psychological well-being (Gao et al. 2010; Gao et al., 2012). See Table 4.9 for a summary of findings.

Although Bahrami et al. (2013), Gao et al. (2010), and Gao et al., (2012) have very different interventions and controls, all demonstrated prenatal education classes had a significant positive effect on maternal well-being. It appears standard prenatal education classes improve maternal well-being when compared to nonattenders and classes with added psychosocial content improved maternal wellbeing as compared to standard classes. In summary, prenatal education classes may improve maternal well-being.

Table 4.9

Maternal Mental Health Mental Well-being Outcomes

Author	Significant findings	Nonsignificant findings
Bahrami et al. 2013	Increased psychological health at 6-8 wks and 1 yr PP	None
Gao et al. 2010	Improved psychological well-being 6 wks PP Improved psychological well-being across time (baseline-6 wks)	None
Gao et al. 2012	Improved psychological well-being across time (baseline-6 wks PP-3 mo PP)	None

4.3.4 Internal Resources

The current systematic review defines internal resources as personal strengths from within which an individual may draw upon to carry out their activities of daily life and cushion them from the stresses of daily life. Five studies examined types of internal resources and are organized according to those that examined confidence (Arcamone, 2005; Schachman, 2004; Serçekuş & Mete, 2010) and those that examined other internal resources including resilience (Schachman et al., 2004), mindfulness (Duncan et al., 2017), and learned resourcefulness (Ngai et al., 2009). See table 4.10 for a summary of findings.

Table 4.10

Maternal Mental Health Internal Resources Outcomes

Author	Significant findings	Nonsignificant findings
Arcamone 2005	None	No change in confidence at 2 wks PP follow-up
Duncan et al. 2017	None	No difference in mindfulness over time (baseline, postintervention/prenatal, 6 wks PP)
Ngai et al. 2009	Increase in learned resourcefulness across time (baseline-post- 6 wks PP-6 mo PP)	None
Schachman et al. 2004	Improved confidence with motherhood at 6 wks PP	No change in internal resources (resilience) at 6 wks PP
Serçekuş & Mete 2010	None	No change in confidence in coping with motherhood at 6 wks PP

4.3.4.1 Confidence

The studies on confidence found differing results. Schachman et al. (2004) found prenatal education classes are effective in increasing confidence, while Arcamone (2005) and Serçekuş

and Mete (2010) did not. It is important to note there are some significant differences in these three research studies. The studies finding no significance were both matched cohort designs that compared the intervention group to nonattenders and consisted of similar content found in standard prenatal education (Arcamone, 2005; Serçekuş & Mete, 2010). The study which found prenatal education classes improved confidence (Schachman et al., 2004) was a RCT which compared standard prenatal education classes to the same classes with additional intervention content on internal and external resources. This intervention included identification and development of internal and external resources, self-reflection, positive feedback, developing confidence and self-esteem, as well as local resources, communication techniques, and friend support. Prenatal education interventions which are designed to address internal and external resources seem to be effective in increasing confidence as compared to standard prenatal education classes. This suggests focused content on confidence, including internal and external resources, in prenatal education may improve confidence in the postpartum period.

4.3.4.2 Other Internal Resources

The included studies identified the following internal resources: mindfulness (Duncan et al., 2017), learned resourcefulness (Ngai et al., 2009), and resilience (Schachman et al. 2004). Schachman et al.'s (2004) study aim was to assess the intervention's effectiveness in improving internal resources using a tool called the Resilience Scale. Duncan et al.'s (2017) small sample pilot study of a newly designed prenatal class series utilized the Five Facets of Mindfulness Questionnaire to measure the change in scores across time. Individual time points were not analyzed for significance. Ngai et al. (2009) measured learned resourcefulness with the Self Control Schedule.

Prenatal education classes were not significant for mindfulness (Duncan et al., 2017) or resilience (Schachman et al., 2004) yet were positively significant for learned resourcefulness (Ngai et al., 2009), although it is not possible to tell where in time this positive change occurred. Due to the nature of across time measures it is not possible to glean when the change may have occurred, as no statistical analysis of differences between groups was performed for individual time points.

Focusing a class on a particular concept may improve its effectiveness for that concept, although the results are mixed, in spite of the similar intervention dose among these studies. Learned resourcefulness content (Ngai et al., 2009) added to prenatal education classes and

additional content on internal and external resources (Schachman et al., 2004) both improved learned resourcefulness and confidence. Yet Schachman et al.'s (2004) study did not demonstrate a benefit for resilience, suggesting the content may not sufficiently address resilience or there may be other factors influencing its success. Duncan et al.'s (2017) study of a mindfulness intervention for labour did not improve mindfulness across time to the postpartum period. Mindfulness may need to be applied further into the postpartum period or addressed differently in the prenatal period to have an effect across time. A comparison of each time point would determine where the effect is or is not occurring.

In summary, prenatal education classes with three to four hours of focused content on internal resources improved learned resourcefulness and confidence but did not demonstrate an increase in resilience or mindfulness when compared to standard prenatal classes. Standard prenatal education classes without focused content on internal resources do not increase confidence compared to nonattenders.

4.4 Social Support

Social support is defined as a mother's support from others, in any form, or social relationships with partner/spouse, family, and/or friends. Nine studies examined various aspects of social support, utilizing various measurement tools. As such social support will be subdivided into the following categories: (a) quality of relationships, (b) instrumental support, (c) support from others, and (d) other concepts of social support.

4.4.1 Quality of Relationships

Four studies examined quality of relationships, with three utilizing the 12-item 'quality of relationship with husband' subscale of the PPSEQ (Arcamone, 2005; Schachman et al., 2004; Serçekuş & Mete, 2010) and one using the three-item 'social relationships' subscale of the WHOQOL-BREF (Bahrami et al., 2013). See table 4.11 for a summary of the findings.

Most studies found prenatal education classes did not improve the quality of relationships. These four studies have some important similarities and differences. The research varied in the type of intervention offered, the control groups, and the measuring tool. All three studies utilizing the 'quality of relationship with husband' subscale of the PPSEQ found no significant results for the intervention group compared to the control (Arcamone, 2005; Schachman et al., 2004; Serçekuş & Mete, 2010). Bahrami et al.'s (2013) study was the outlier, finding significant results at six to eight-weeks postpartum and nonsignificant results at one year postpartum, when

compared to nonattenders. This study utilized a brief three-item tool of 'social relationships' of unknown content. Although this study found a significant result, care must be taken when comparing to the three studies utilizing the 'quality of relationship with husband' subscale as this differing result may be due to the scale rather than the intervention. Schachman et al.'s study found no significant difference between the group that received the added component on external and internal resource and the standard prenatal education class group for the quality of relationships outcome. Three studies with similar prenatal education class content compared attenders to nonattenders/usual care, with only Bahrami et al. finding a significant result (Arcamone, 2005; Bahrami et al., 2013; Serçekuş & Mete, 2010). There is also variation in time of measure and study design among the three similar studies. Nonsignificant results were found at two-weeks postpartum (Arcamone, 2005). Bahrami et al. found social relationships were improved at six-weeks postpartum, whereas Serçekuş and Mete and Schachman et al. did not. At one-year postpartum there was no significant difference for any of the studies.

Table 4.11

Social Support Quality of Relationships Outcomes

Author	Significant findings	Nonsignificant findings
Arcamone 2005	None	No change in quality of relationship at 2 wks PP
Bahrami et al. 2013	Improved quality of social relationship at 6-8 wks PP	No change in quality of social relationship at 1 yr PP
Schachman et al. 2004	None	No change in quality of relationship with husband at 6 wks PP
Serçekuş & Mete 2010	None	The intervention did not change quality of relationship with husband at 6 wks PP

To summarize, most studies do not demonstrate prenatal education classes improve quality of relationships. The one study which did show a positive benefit is similar in content, intervention, and measuring time to other studies which did not demonstrate a significant effect (Bahrami et al., 2013); this may be due to a measuring tool which may have not addressed specifically the husband relationship, or other unknown factors. Quality of relationships may be influenced by which relationships are examined.

4.4.2 Instrumental Support

Three studies examined instrumental support. Instrumental support is considered to be support given on a practical level, such as assistance with housework or infant care as opposed to emotional support. Two tools were utilized to measure instrumental support. Matthey et al.

(2004) examined mothers' satisfaction with the sharing of home and baby tasks with her partner with the Who Does What/Who Will Do What? tool (WDW). Two studies utilized the 'mother's perception of husband's participation' subscale of the PPSEQ (Schachman et al., 2004; Serçekuş & Mete, 2010). See table 4.12 for a summary of the findings.

Table 4.12

Social Support Instrumental Support Outcomes

Author	Significant findings	Nonsignificant findings
Matthey et al. 2004	Women with low self-esteem are significantly more satisfied with sharing home and baby tasks at 6 wks PP	No change in satisfaction with sharing home and baby tasks at 6 wks PP for medium and high self-esteem women or 6 mo PP for any women
Schachman et al. 2004	None	No change in perception of husband participation at 6 wks PP
Serçekuş & Mete 2010	None	No change in perception of husband participation at 6 wks PP

In summary, instrumental support in the form of perception of husband participation and satisfaction with sharing home and baby tasks was not influenced by prenatal education classes, other than for a subset of women with low self-esteem at six-weeks postpartum (Matthey et al., 2004).

4.4.3 Support from Others

Support from others includes measures of support which are not specifically task oriented, such as emotional support. Three studies examined support from others. The Significant Others Scale examined emotional support from the partner, mother, and four other self-identified people (Matthey et al., 2004). Two studies utilized the 'support for the maternal role from family and friend's' subscale of the PPSEQ (Schachman et al., 2009; Serçekuş & Mete, 2010). See table 4.13 for a summary of the findings.

The influence of prenatal education classes on support from others is mixed, with two studies finding nonsignificant results and one finding significant results. Schachman et al.'s (2004) additional four hours of content on internal and external resources improved support for the maternal role from family and friends at six-weeks, while Matthey et al.'s (2004) and Serçekuş and Mete's (2010) interventions did not. Matthey et al. (2004) also found no significant difference at the six-month time point. The contradictory results among studies may be because Schachman et al.'s study was specific to the identification and development of internal and external supports for military families, which tend to have fewer family supports and partners

who may be absent due to deployment. It appears an intervention focused on developing internal and external supports may improve support from others at six-weeks postpartum in some contexts.

Table 4.13

Social Support from Other's Outcomes

Author	Significant findings	Nonsignificant findings
Matthey et al. 2004	None	No change in support from others at 6 wks or 6 mo PP for any women, regardless of self-esteem level
Schachman et al. 2004	Increased support for the maternal role from family and friends at 6 wks PP	None
Serçekuş & Mete 2010	None	The intervention did not change support for maternal role from family/friends at 6 wks PP

4.4.4 Other Concepts of Social Support

Other concepts of social support are defined as any concept related to social support which do not fit into the other sub-outcomes of social support. There were several other concepts of social support identified in the included studies, such as couple communication (*n*=1) (Daley et al., 2015), parenting alliance (*n*=1) (Koushede et al., 2017), satisfaction with relationships (*n*=2) (Daley et al., 2015; Gao et al, 2010), and perception of support (*n*=2) (Gao et al., 2012; Schachman et al., 2004). See table 4.14 for a summary of the findings.

Relationship satisfaction demonstrated mixed results. Gao et al. (2010) found a significant result in relationship satisfaction at the six-week time point alone and no significance in the across time measure, whereas Daley-McCoy et al. (2015) did not measure single time points. Gao et al.'s study utilized a new author derived tool in which validity has been examined but reliability has not yet been reported. Daley-McCoy et al. measured relationship satisfaction with the Couple Satisfaction Scale. It appears prenatal education classes which include communication skills and use psychoeducational approaches may improve relationship satisfaction at six-weeks postpartum and may demonstrate some success in decreasing deterioration of relationship satisfaction over time from baseline to six-weeks.

Two studies examined perceived social support. Gao et al.'s (2012) three-month follow-up study measured perceived social support with the Perceived Social Support Scale. Schachman et al.'s (2004) study measured the perception of social support using the Personal Resources Questionnaire (PRQ-85). Evidence supporting prenatal education classes improve the perception

of social support is mixed. The class with the positive benefit was of overall shorter duration (Gao et al., 2012) than the class with no benefit (Schachman et al., 2009), although the time spent on the specific added content was similar and was similarly presented at each class. Both interventions included information on social support and communication skills. A significant difference between the classes was Gao et al. (2012) utilized interpersonal psychotherapy techniques, which may have resulted in the improved success of this intervention. It appears prenatal education classes which include interpersonal psychotherapy techniques and added content on communication and social support improved mother's perception of social support at three-months postpartum and across time from baseline to six-weeks postpartum to three-months postpartum.

Table 4.14

Social Support Other Concepts Outcomes

Author	Significant findings	Nonsignificant findings
Daley-McCoy et al. 2015	Decreased deterioration in relationship satisfaction over time (baseline-6 wks PP)	No difference in couple communication
Gao et al. 2010	Improved satisfaction in interpersonal relationships at 6 wks PP	While the intervention group did demonstrate improved satisfaction in interpersonal relationships at 6 wks PP, there was no significant difference between groups over time (baseline-6 wks PP)
Gao et al. 2012	Improved perceived social support at 3 mo PP Improved perceived social support across time (baseline-6 wks PP-3 mo PP)	None
Koushede et al. 2017	None	No change in parenting alliance at 6 mo PP follow-up
Schachman et al. 2004	None	No change in external support/perceived social support at 6 wks PP

Prenatal education classes demonstrate mixed benefits for other concepts of social support. Classes which include interpersonal psychotherapy techniques and have added content on communication and social support may improve mothers' perceptions of social support at three-months postpartum. There are mixed results for the benefit of prenatal education classes in improving relationship satisfaction, with some support noted at six-weeks via a new tool. Prenatal education classes have not been shown to improve couple communication or parenting alliance.

4.5 Transition to Motherhood

Transition to motherhood is the process of becoming a mother, sometimes described as role attainment or adaptation, with a complex interplay of factors necessary for successful transition to motherhood (Mercer, 2004). Outcomes such as social support and mental health influence this transition. There are seven studies which involved measures of transition to motherhood via two sub-outcomes: satisfaction with motherhood and life (see Table 4.15), and self-efficacy (See Table 4.16).

The PPSEQ, as a total score, is described as a measure of maternal role competence (Schachman et al., 2004; Serçekuş & Mete, 2010). The current review examines the individual subscales rather than the total score as the subscales provide a better to fit to the outcomes chosen for the review. Three studies examined the 'satisfaction with motherhood and infant care' subscale (Arcamone, 2005; Schachman et al., 2004; Serçekuş & Mete, 2010) and two examined the 'satisfaction with life situation and circumstance' subscale (Schachman et al., 2004; Serçekuş & Mete, 2010).

Four studies examined self-efficacy with three using the Parenting Sense of Competence Scale (PSOC), a measure of maternal role competence or parenting sense of competence (Gao et al., 2012; Matthey et al., 2004; Ngai et al., 2009). All three of these studies used the 'efficacy' subscale (PSOC-E). The fourth study measured perceived parenting self-efficacy with the Postnatal Parent Expectations Survey, a scale in use since 1992 (Svensson et al., 2009).

4.5.1 Satisfaction with Motherhood and with Life

The satisfaction with motherhood and with life outcome comprised two measuring tools, both of which are subscales of the PPSEQ, with all three studies examining the 'satisfaction with motherhood and infant care' subscale and two examining the 'satisfaction with life situation and circumstance' subscale. A significant finding occurred in the 'motherhood and infant care' subscale but not in the 'satisfaction with life situation and circumstance' subscale for an intervention comparing added content on internal and external resources to standard prenatal education classes (Schachman et al., 2009). Two studies compared attender's versus nonattenders, both finding the intervention did not improve satisfaction with motherhood or with life (Arcamone, 2005; Serçekuş & Mete 2010). It is unexplained why the intervention with additional psychosocial content improved mothers' satisfaction with motherhood but did not improve overall satisfaction with life.

Table 4.15

Transition to Motherhood Satisfaction with Motherhood and with Life Outcomes

Author	Significant findings	Nonsignificant findings
Arcamone 2005	None	No change in satisfaction with motherhood and infant care at 2 wks PP
Schachman et al. 2004	Increased satisfaction with motherhood and infant care at 6 wks PP	No change in satisfaction with life situation and circumstance at 6 wks PP
Serçekuş & Mete 2010	None	No change in satisfaction with life situation and circumstance at 6 wks PP No change in satisfaction with motherhood and infant care at 6 wks PP

4.5.2 Self-Efficacy

Self-efficacy is the belief in one's abilities. Four studies examined self-efficacy. The effectiveness of prenatal education on self-efficacy is mixed. Three found the intervention to have significant results, although one of those studies found significance only for a subgroup of women with low self-esteem, and this was not significant when intention to treat analysis was used. Self-efficacy improved at six-weeks (yet only for women with low self-esteem) (Matthey et al., 2004), eight-weeks (Svennson et al., 2009), and three-months postpartum (Gao et al. 2012), as well as across time from baseline to six-weeks postpartum to three-month postpartum (Gao et al. 2012).

All of the studies had interventions which went beyond the standard prenatal class content to include added components or a new design to prenatal education, and all utilized standard prenatal classes as controls. In summary it appears prenatal classes with added components or new designs which incorporate empathy, increased parenting content or transition to motherhood, communication, and conflict resolution skills significantly improve self-efficacy. It may be that longer dose interventions of at least three hours, or content spread throughout the series has added benefit to general populations, as Matthey et al.'s (2004) shorter intervention of one session in length only improved self-efficacy for women with low self-esteem, with no benefit for the general sample or women with medium or high self-esteem. It also appears prenatal education classes support self-efficacy at various time points including six-weeks, eight-weeks, three-months. Gao et al.'s (2012) across time measure demonstrated significance which may be due to the significant finding at three-months postpartum. Ngai et al.'s (2009) across time measure did not show significance; individual time point comparison was not conducted.

Table 4.16

Transition to Motherhood Self-Efficacy Outcomes

Author	Significant findings	Nonsignificant findings
Gao et al. 2012	Improved maternal role competence at 3 mo PP Improved maternal role competence across time (baseline-6 wks PP-3 mo PP)	None
Matthey et al. 2004	Improved parenting sense of competence at 6 wks PP follow-up only for women with low self-esteem and not when intention to treat analysis was performed	No change in parenting sense of competence at 6 wks and 6 mo PP follow-up for women with medium and high self-esteem
Ngai et al. 2009	None	No difference in maternal role competence over time (baseline-post-6 wks PP-6 mo PP)
Svensson et al. 2009	Increased perceived parenting self-efficacy 8 wks PP follow-up	None

4.6 Infant Care

A single included study, Serçekuş and Başkale (2016), examined the outcome of infant care. This study aimed to examine the effect of prenatal education in a low resource country (Turkey) as prenatal education is not standard practice in many low resource countries (Serçekuş & Başkale, 2016). A matched cohort intervention compared prenatal education classes (*n*=28) to usual prenatal care (*n*=27). The intervention focused on topics of pregnancy, childbirth, coping with pain, parenting, newborn care and feeding, and mother/father interaction with the infant. Serçekuş and Başkale (2016) examined several outcomes, with mother-infant attachment as measured by the Maternal Attachment Inventory tool being the one of interest to the current systematic review. Prenatal education classes had no significant impact on infant care via maternal-infant attachment for mothers at four-months postpartum compared to the control group according to Serçekuş and Başkale.

4.7 Limitations of the Studies

Research on prenatal education classes demonstrates some common limitations among the included studies. The first limitation is generalizability as the studies examined for the current review were not geographically diverse, with the findings reflective of particular programs offered in singular locations for primiparous adult women with a high level of education and no social or medical risk factors. Only one study performed a sub-analysis based on a risk factor for mental health (Matthey et al, 2004). A deliberate decision was made to focus the current review

on only studies examining general populations. As a result, the findings may not be reflective of studies which target women in vulnerable circumstances, such as low income, adolescent mothers, or mental health risks. Although these results are not generalizable to vulnerable women, it is still of value to conduct research on general populations of adult primiparous women, as this is the group most likely to currently attend prenatal education classes and there is value in knowing if this intervention is of benefit.

Second, there are some limitations in the methodology and statistical analysis employed in some of the included studies. Most studies included self-report measures rather than employing objective measurement tools in assessing the relevant outcomes. In addition, some studies collected data on specific time points yet analyzed across time measures, with no mention of a comparison on the single points in time. This can make it challenging to discern when an intervention had an effect or not as it is unknown where in time the change occurred. If the across time measure includes prenatal and postnatal measuring times, it is not possible to determine if the change occurred during the desired postpartum time frame for the current systematic review. Other specific limitations in select studies includes two studies with small sample sizes (Daley-McCoy et al., 2015) one of which is an underpowered pilot study (Duncan et al., 2017), two studies which reported potential limitations due to extra contact with researchers (Ngai et al., 2009; Schachman et al., 2004), and one study which identified a limitation of contagion effect due to the small geographic location, such that women may have known each other (Schachman et al. 2004).

4.8 Summary of Findings

The current systematic review examined prenatal education outcomes of interest based on the Canadian guidelines for prenatal education, namely: maternal mental health, social support, transition to motherhood, infant care, and sexuality. No studies were found for the outcome of sexuality and infant care was limited to one study.

It is apparent the research demonstrates prenatal education classes have varying effects on mothers, with many studies reporting on the same outcomes but demonstrating differing results. This highlights the complexity of becoming a mother, the goal of prenatal education classes to influence a complex life transition, and the difficulty in controlling a complex public health intervention. Being a new mother is complicated, as there are multiple aspects of one's life undergoing change. There are a great number of maternal, infant, and social variables which

influence this change (Mercer, 2004). This makes it difficult for one intervention to address all the factors affecting becoming a mother. There are correlations between mental health, social support, and transition to motherhood, which complicate examining any one concept in isolation. Public health interventions occur in a community context in which multiple variables influence the implementation of prenatal education classes and the mothers, limiting the amount of control researchers can exert. The results of the current systematic review must be understood within the lens of a complex life transition and a complex public health intervention, both affected by multiple variables.

The above discussion reveals that prenatal education with added components or new designs with content related to the outcomes under study are generally more effective when compared to control groups of standard prenatal education classes of typical content. When standard prenatal education classes were compared to nonattendance or usual prenatal care in five studies, the results were mainly nonsignificant. This suggests adding content specifically related to maternal mental health, social support, and transition to motherhood has the potential to positively influence some select outcomes. It appears there may be a dose response, with add-on interventions occurring in more than one session often successful when compared to interventions of one session in length. In addition, psychosocial content threaded throughout a series was more likely to produce significant results.

Prenatal education with added components may improve: (a) maternal mental health sub-outcomes of depressive symptoms and PPD diagnosis, maternal well-being, confidence, and learned resourcefulness; (b) social support outcomes of support from others, perception of social support, and relationship satisfaction; and (c) the transition to motherhood outcomes of satisfaction with motherhood and infant care, and self-efficacy for the general mother population. In contrast, prenatal education classes of any type did not demonstrate any substantive effect on: (a) maternal mental health outcomes of distress, worry, resilience, and mindfulness; (b) social support outcomes of support from others, parenting alliance, and couple communication; (c) transition to motherhood outcome of satisfaction with life, or (d) an infant care outcome. It is unknown if prenatal education classes impact sexuality as no research on this outcome was found to inform the review. On the whole, prenatal education has limited benefits on the maternal outcomes assessed for in the current systematic review.

CHAPTER FIVE
DISCUSSION

Prenatal education classes, as one aspect of prenatal care, are a common healthcare intervention which aims to provide pregnant women with information and support on numerous topics for pregnancy, labour and birth, and early parenting. The classes are a long standing intervention and have become a part of the tradition of pregnancy and a cultural expectation for primiparous women in many parts of the world. Previous researchers have demonstrated prenatal education is beneficial for some birth outcomes such as decreased false labour admissions, decreased birth anxiety, and increased partner participation (Ferguson, Davis, & Browne, 2013) and in prenatal improvements in breastfeeding knowledge and self-efficacy (Wood et al., 2016). The current systematic review aims to examine the effectiveness of the classes for psychosocial outcomes in the postnatal period.

The results of the current systematic review suggest prenatal education classes are of mixed effectiveness for pregnant women related to the outcomes of interest. There are overall some positive findings in the current review for some aspects of maternal mental health, social support and transition to motherhood. Interventions with focused content impacted several sub-outcomes of maternal mental health including decreasing depressive symptoms, improving maternal well-being, and improving the internal resources of confidence and learned resourcefulness. There was no effect on the sub-outcomes of maternal mental health concerns or internal resources-resiliency. These focused interventions also positively impacted social support sub-outcomes of support from others and other concepts of social support, namely relationship satisfaction. The interventions did not have an impact on the social support sub-outcomes of quality of relationships, instrumental support, or other concepts of social support, namely parenting alliance and couple communication. Additionally, interventions with focused content improved the transition to motherhood sub-outcomes of satisfaction with motherhood, and self-efficacy, but not satisfaction with life.

Interventions comparing standard prenatal education classes to nonattenders/usual prenatal care found one study that demonstrated prenatal education classes had a positive impact

on the maternal mental health outcome of mental well-being and the social support outcome of quality of relationships, at six to eight weeks only. Studies of this type found prenatal classes were not effective for the maternal mental health sub-outcomes of depression and internal resources-confidence, the social support sub-outcomes quality of relationships, instrumental support, and support from others, the transition to motherhood outcomes, or the infant care outcomes. It is unknown if prenatal education classes have any impact on sexuality as studies located for the current review did not include this outcome.

Three trends were noted among the interventions that demonstrated positive significant results. Firstly, prenatal education classes are more likely to be effective when the classes incorporate topics beyond the standard content of birth, coping with pain, and infant and postpartum care, and include focused content related to the psychosocial outcomes of maternal mental health, social support, and transition to motherhood (Daley-McCoy et al., 2015; Duncan et al., 2017; Gao et al., 2010; Gao et al., 2012; Mao et al., 2012; Matthey et al., 2004; Ngai et al., 2009; Schachman et al., 2004; Svensson et al., 2009). Prenatal education classes without focused content generally do not demonstrate a benefit for the outcomes of interest over nonattendance/usual care. Secondly, focused content studies included a psychosocial skill component in all but one study, therefore it may be the practice of skills contributes to the increased significance of these studies (Daley-McCoy et al., 2015; Duncan et al., 2017; Gao et al., 2010; Gao et al., 2012; Mao et al., 2012; Ngai et al., 2009; Schachman et al., 2004; Svensson et al., 2009). Thirdly, focused content of a longer duration demonstrates a benefit compared to focused content of shorter duration (Duncan et al., 2017; Gao et al., 2010; Gao et al., 2012; Mao et al., 2012; Ngai et al., 2009; Schachman et al., 2004; Svensson et al., 2009). The term ‘longer duration’ is defined as including studies of new design in which psychosocial content was threaded through the course series or add-ons of at least three total hours spread across more than one class session. Additionally, these three trends tended to occur in counties in which prenatal education classes have been a long standing intervention (e.g., Australia, UK, USA, China/Hong Kong).

In contrast standard prenatal education classes compared to nonattenders/usual care demonstrated, overall, nonsignificant findings for psychosocial outcomes and tended to be researched in countries (Iran, Turkey) or areas of the country (Denmark) in which the researchers

indicated prenatal education is a new intervention (Bahrami et al., 2013; Maimburg & Væth, 2015; Serçekuş & Başkale, 2016; Serçekuş & Mete, 2010).

5.1 Implications for Practice

The goal of prenatal education in Canada, in relation to the outcomes under study, is to support positive self-esteem and self-competence of new mothers, improve communication and the family relationship, and positively influence postpartum adjustment via education on pregnancy, labour and birth, early parenting, changing roles and relationships, infant feeding, sexuality, and family planning (Health Canada, 2000). The current systematic review addressed these psychosocial goals of importance to prenatal education, by assessing the effectiveness of prenatal education classes on the outcomes of maternal mental health, social support, transition to motherhood, infant care, and sexuality.

The present systematic review found prenatal education classes with focused psychosocial content, and/or skills components, and/or of longer duration to be more effective for select outcomes of interest. Such interventions may improve aspects of maternal mental health, social support, and transition to motherhood, although the diversity of interventions, controls, and measuring tools make it difficult to come to a conclusive decision. Only one study of standard prenatal education examined infant care, therefore it is difficult to assess whether focused content on infant care, with or without skills related to infant care, will influence this outcome. See Table 5.1 for a summary of focused content topics and skills which demonstrated significant positive results.

Psychoeducational prenatal education classes with sufficient content in these areas may result in positive outcomes for some aspects of maternal mental health, social support, and transition to motherhood for the general population of new mothers. Overall, prenatal education with standard content on labour and birth, coping with pain, and infant and postpartum care does not appear to improve psychosocial outcomes. This supports the need to have specific psychosocial content of longer duration via two or more added sessions totaling at least three hours or focused content integrated throughout the series if the goal is to improve maternal mental health, social support, transition to motherhood, and infant care.

There have been other systematic reviews regarding prenatal education classes. Gagnon and Sandall (2007) conducted a Cochrane review of the effectiveness of individual or group prenatal education interventions on birth and psychosocial outcomes, finding a general pattern of

small sample sizes and uncertain quality of research, which resulted in no evidence to support the effectiveness of prenatal education interventions. The strict criteria of a Cochrane review may have limited important findings due to the difficulty in randomization of public health interventions. A significant difference between the Gagnon and Sandall review and the current review is the inclusion of a broader range of study designs than is possible in a Cochrane review. Due to the difficulties in randomizing prenatal class populations, the inclusion of matched cohort designs with recognition of the limitations this imposes, nonetheless may add clarity to the effectiveness of prenatal education classes.

Table 5.1

Focused Content and Skills Demonstrating a Positive Result

Outcome	Content	Skills
Maternal mental health	Mindfulness	Practice mindfulness
	Interpersonal psychotherapy	Personalized coping
	Psycho-educational approach	Communication skills
	Emotional self-management	Conflict resolution
	Learned resourcefulness	Cognitive restructuring skills
	Internal and external resources	Problem solving strategies
	Self-confidence	Decision making
	Social support	Goal setting
	Stress and emotional changes	Coping skills
	Transition to motherhood	Develop/practice internal/external resources
		Self-reflection
		Parenting skills
Social support	Interpersonal psychotherapy	Communication skills
	Psycho-education approach	Conflict resolution
	Relationship functioning	Develop/practice internal/external resources
	Internal and external resources	Self-reflection
	Self-confidence	
	Social support	
	Transition to motherhood	
Transition to motherhood	Interpersonal psychotherapy	Communication skills
	Increased parenting content	Conflict resolution
	Internal and external resources	Develop/practice internal/external resources
	Self-confidence	Self-reflection
	Social support	Parenting skills
	Transition to motherhood	Problem solving strategies

Brixval et al. (2015) conducted a systematic review with RCT, quasi-experimental, and cluster randomized studies. Brixval et al. examined a number of birth and psychosocial outcomes during pregnancy and postpartum and found overall insufficient evidence to support prenatal

education classes. In comparison to the current review, these two reviews similarly found variety in the types of interventions and controls, as well as limited significant results. Brixval et al. found studies examining depression intervention classes or standard prenatal education classes versus standard care or standard education classes did not demonstrate effectiveness, unlike the current systematic review which found limited effectiveness for some aspects of maternal mental health.

There have been a number of systematic reviews focused on maternal mental health interventions. Fontein-Kuipers et al.'s (2014) systematic review and meta-analysis of RCTs examined a number of prenatal and postnatal preventative and treatment interventions for maternal distress, finding prenatal education class interventions did not improve maternal distress, except for the subgroup of women vulnerable to maternal distress (Fontein-Kuipers et al., 2014). Another meta-analysis of RCTs with multiple types of psychosocial and psychological prenatal and postnatal interventions was non-significant on the prevention of PPD (Dennis, 2005). Clatworthy's (2012) systematic review of RCTs examined group and individual prenatal interventions finding mixed results for women with moderate or severe risk and no benefit for women with low or no risk. The review found psychological therapy more effective than educational interventions. Lastly, Alderdice et al. (2013) conducted an umbrella review of systematic reviews on education, screening, and support interventions for maternal mental health. This review found a broad range of interventions and a lack of consistency in the quality of the research finding it hard to make practice recommendations. The current systematic review focused on only prenatal education interventions for the general population and found mixed results. Unlike other reviews on PPD, the current review found prenatal class interventions with focused psychosocial content and/or skills incorporation and/or of sufficient length may benefit the general population, which is possibly attributed to the inclusion of matched cohort study design allowing for a broader view of the current state of the literature. Similar to Fontein-Kuipers et al. and Clatworthy, the current review found a study with a short duration intervention benefited only an at risk subgroup of women. Although the current study did not focus on vulnerable mother populations, this one study, when viewed with other systematic reviews examining this population suggests there may be value in focusing interventions towards vulnerable populations.

An important aspect of the current systematic review is to consider the practice implications of each of the five outcomes. Maternal mental health is a significant issue for women. The WHO (2008) has reported PPD is an important global issue for approximately 10-15% of women in high income countries and 10-41% of women in middle to low income countries. As such, it is likely there will be women with PPD or at risk of developing PPD attending prenatal education classes. The current systematic review suggests prenatal education classes with content on psychosocial outcomes may lessen PPD. The PHAC (2009) has found 65% of primiparous women attend prenatal education classes in Canada. Given the large proportion of women who do attend in some regions, prenatal education classes are a vehicle towards reducing the burden of PPD for the general population of women.

The current review suggests there is little research evaluating infant care outcomes with only one study found. This is despite evidence that infants of women with maternal mental health concerns in high income countries experience poorer psychological and emotional development outcomes, and infants in low and middle income countries additionally experience low birth weight and infant growth, decreased breastfeeding and vaccination rates, malnutrition, and diarrhea (WHO, 2008). This supports the need to utilize prenatal education interventions to improve mental health outcomes to benefit both mother and infant. Prenatal education classes provide an opportunity to reach a number of women in a cost-effective manner.

There are relationships between maternal mental health, social support, and transition to motherhood. Fonsenca et al. (2017) found women who have clinically significant depressive symptoms are more likely to have negative beliefs about motherhood, negative thoughts, and less self-compassion compared to those without clinically significant depressive symptoms. Social support is negatively correlated with PPD (Leahy et al., 2011; Razurel & Kaiser, 2015) and positively correlated with parental self-efficacy (Razurel & Kaiser, 2015). Emmanuel et al. (2008) found partner relationships of a short duration and a lack of social support negatively impact maternal role development. Ngai and Chan (2011) looked at several of these relationships, finding greater learned resourcefulness, positive social support, and fewer depressive symptoms directly and positively impact maternal role competence. Increased learned resourcefulness and social support are also associated with fewer depressive symptoms (Ngai & Chan, 2011). Increased social support and learned resourcefulness mediate the effect of stress on maternal role competence and depressive symptoms (Ngai & Chan, 2011). These studies highlight the strong

interconnectivity of maternal mental health, social support, and transition to motherhood. An effective intervention in one outcome area may demonstrate importance in other psychosocial outcomes. The current systematic review found the outcome with the greatest positive significance was PPD, with less overall support for social support and transition to motherhood, although select studies of focused psychosocial content and/or skills and/or longer duration showed support for some sub-outcomes. For this reason, it is worth considering how prenatal education may influence social support and transition to motherhood which may in turn influence PPD and each other.

As discussed, transition to motherhood is intertwined with maternal mental health and social support. The current review suggests prenatal education classes have mixed success in assisting women in the transition to motherhood. The review found studies show mixed results for satisfaction with motherhood and self-efficacy, and no significance for satisfaction with life. This suggests the content of the classes may be important, finding classes with increased parenting content, transition to motherhood content, communication and conflict resolution skills to be of benefit.

The social support outcome is of importance to nursing due to the impact social support has on motherhood and mental health. While the current review found prenatal education classes do improve relationship satisfaction and support from others, there is less evidence the classes improve instrumental support, quality of relationships, parenting alliance, or couple communication. This indicates prenatal education may not be the right vehicle for all aspects of social support or may need content adjustment to benefit certain aspects of social support.

Research has shown a woman's satisfaction with social support from her own mother, spouse, other family and friends, and professionals may positively influence psychological health (Razurel & Kaiser, 2015). This quantitative study also found prenatal education class attendance was positively associated with mother's satisfaction with support from friends, their own mothers, and professionals during the postpartum period (Razurel & Kaiser, 2015). A qualitative study which examined friendship in prenatal education found mothers who wished to find friendship during this time period and within classes may do so, but not all prenatal education classes are conducive to making friends (Nolan et al., 2012). Friendships developed in prenatal education classes supported women's mental health and self-efficacy (Nolan et al. 2012). The current systematic review suggests mixed results for social support; therefore, women may

benefit from an increased focus on social support in prenatal education classes, since social support itself positively influences maternal mental health and transition to motherhood.

Determining the dose of an intervention is important in knowing how much time to allot to psychosocial content in prenatal education classes. The current review found most interventions of added content of three or more hours spread throughout at least two sessions of the series or focused content threaded throughout the series are more successful than interventions which occurred on a one-time basis. Sufficient time devoted to psychosocial content may be needed to ensure an effect on psychosocial issues. While this may seem lengthy, prenatal education in a group setting provides for a cost saving approach compared to individualized education. Lengthening classes is not always an option and some classes may have time constraints in covering several areas of content. The reworking of psychosocial content throughout a series may provide a way to increase the impact of psychosocial content if lengthening a class is not an option.

The current review found a number of the interventions which demonstrated effectiveness incorporated skills such as communication, conflict resolution, self-reflection, problem solving and decision-making, and cognitive restructuring. It may be prenatal education with skills components are more effective than simple knowledge transfer alone. Clatworthy's (2012) review found interventions based on psychotherapy or psychoeducational approaches to be more effective than traditional educational approaches, particularly for women at greater risk of PPD. The findings of these two reviews support the inclusion of focused content on psychosocial issues and psychotherapeutic or psychoeducational approaches for prenatal education classes.

Another consideration is increasing networking and building social support among participants within classes. Although networking has not been extensively studied in prenatal education literature, there may be a benefit due to the interconnectedness of psychosocial outcomes. The current review found one RCT encouraged women to expand their support networks among other mothers and provided information on other services and groups offered in the community, resulting in increased confidence and support for the maternal role from family and friends, although no increase in the perception of that support (Schachman et al., 2004). The degree of networking was not measured (Schachman, 2004). Another study had an accompanying website for mothers to develop community and support, but did not directly measure support (Koushede et al., 2017). These findings suggest there has not been an emphasis on building

support in most prenatal education classes, yet there may be a benefit, although it is largely unknown. Further development of the networking aspect of prenatal education warrants exploration in future classes.

Although it is beyond the scope of the current systematic review to address other outcomes of interest to registered nurses and other prenatal educators, it is of worth to note previous literature researchers have examined birth and breastfeeding outcomes. Brixval et al. (2015) and Gagnon and Sandall's (2009) systematic reviews, described earlier in relation to psychosocially outcomes, demonstrated limited benefits in shorter labours and increased spontaneous vaginal labour but noted difficulty in making practice recommendations due to small samples, inconsistent quality of trials, and heterogeneity of outcomes (Brixval et al., 2015; Gagnon & Sandall (2009). Ferguson et al.'s (2013) structured review also demonstrated a limited benefit for reduction in false labour admissions, decreased anxiety and improved partner participation. Breastfeeding literature suggests education delivered to vulnerable populations is of benefit and must consider the unique needs of the particular population (Sipsma et al., 2018; Wong et al., 2015. Wood et al. (2016) found group prenatal education in breastfeeding improves skill, knowledge, and self-efficacy prenatally with decreased knowledge transition to the postnatal period. The results of the current systematic review, as it considers only psychosocial outcomes, must be considered within the context of other outcomes of interest for prenatal education classes. Collectively, the reviews suggest prenatal education has benefits for select outcomes, with challenges in research quality.

5.2 Implications for Research

There are several implications for research. Firstly, there is a paucity of research on the outcomes of infant care and sexuality, despite these being outcomes identified by Health Canada (2000) as a goal of prenatal education. Secondly, the literature search did not locate any Canadian research. As well, there was only one article in the included studies in which a registered nurse was the prenatal educator. At face value this might suggest registered nurses are not often prenatal educators, yet in Western Canada prenatal education is most commonly delivered via the provincial health care systems by registered nurses. The effectiveness of prenatal education is a topic of importance to registered nurses. Canadian researchers may want to consider the effectiveness of prenatal education by registered nurses in a Canadian context to address this knowledge gap.

Thirdly, although a few previous systematic reviews included fathers, many outcomes were measured for women only and with few outcomes specific to fathers under study. Prenatal education classes are often attended by both the mother and her support person, therefore additional research on outcomes for fathers and other partner relationships is of interest to the effectiveness of the intervention for the support person population.

Fourth, the internet has added a new dimension to prenatal education. The current review did not examine online prenatal education classes. As women of childbearing age are daily users of the internet and pregnant women utilize the internet to seek information and social support, it is of value for researchers to examine the effectiveness of online prenatal education classes in comparison to standard prenatal education classes and explore the use and role of technology in prenatal education.

Fifth, another aspect of prenatal education not addressed with this research is to determine what the subjective benefits of prenatal education are for mothers. A systematic review on the qualitative benefits of prenatal education may be important as prenatal education classes are quite popular among primiparous women and have become a part of the cultural expectation of pregnancy. It may be of interest to know if women perceive a cultural benefit in attending prenatal education, in spite of the mixed demonstration of effectiveness for prenatal education, and attempt to determine what that benefit may be. It would be of interest to conduct a review of literature on women's perceptions of the benefit they receive to have a fuller understanding of the role of prenatal education plays for the participant women.

Sixth, an area for consideration in future prenatal education class effectiveness research is to support the quality of public health intervention research. Common observations among the included studies suggests there are areas for improvement. Previous researchers have noted program integrity is not consistently assessed in prevention research, yet it is important to effectiveness and prevention research as multiple variables may influence the integrity of the intervention (Dane & Schneider, 1998). Researchers recommend, although many studies assess only one or two aspects of program integrity, studies examine five areas for a complete picture of program integrity, as described in section 3.5 (Dane & Schneider , 1998). The current systematic review chose to assess three areas of program integrity. The included studies consistently assessed two areas of program integrity; exposure to the intervention (length of classes) and quality of delivery (credentials of the educators). Only 1 of 15 studies measured adherence.

Daley-McCoy et al.'s (2015) feasibility and effectiveness study examined adherence by using observers to assess the consistency of the intervention across the classes. As public health interventions have long causal pathways, adherence to program integrity is one area which can be measured as an assessment of internal validity, without significant adversity to researchers.

Additionally, attrition is an issue in public health research, therefore intention to treat analysis is of importance. While most studies did use intention to treat analysis, or utilized both and compared the results, it is important for future researchers to consider this analysis in public health interventions. Some studies included across time measures with no comparison statistic or reporting on each of the time points which were measured. An across time measure may be beneficial when reported alongside the specific time points to understand when the intervention is most successful or when it no longer appears to be successful. Reported alone it is of limited usefulness as it is difficult to tell at what point in time the intervention demonstrated significance or nonsignificance. In addition, most of the included studies did not report on the clinical relevance of significant results. It would be of benefit to readers to have this information clearly stated.

Lastly, an area to consider in future research is the heterogeneity in measuring tools, interventions, and concepts used to describe maternal mental health, social support, and transition to motherhood. The heterogeneity of this topic is indicative of its complexity. This difficulty in synthesis has been recognized by others (Alderdice et al. 2013; Brixval et al. 2015; Fontein-Kuipers et al. 2014; Koehn, 2002). Although there are similar themes of class type and content found in the research included in the current review, it would not be possible to strictly standardize prenatal education interventions, as they are delivered in multiple countries, in multiple settings, by a variety of educators, and by multiple health organizations, which tailor classes to a particular population or system need. Standardization of the concepts used to describe psychosocial constructs impacting becoming a mother is difficult as evidenced by the multiple interpretations of what constitutes social support, transition to motherhood, and maternal mental health. The outcome of depression was one outcome which did demonstrate homogeneity with most studies utilizing the EPDS and one study utilizing the CES-D, which may be due to greater standardization of the definition of PPD. Researchers have examined measuring tools on depression used in the perinatal period to determine which of the many tools have the greatest reliability and validity, finding the EPDS and CES-D to be the best available tools (Gaynes et al.

2005). Additional research on the best tools for social support and transition to motherhood, will aid prenatal education class effectiveness research.

5.3 Limitations of the Systematic Review

The following discussion outlines the limitations of the current systematic review. Firstly, the review is limited in its generalizability. The current review is limited in its scope to a birthing mother population in a female-male partnership. An assumption is made in some studies of a female-male partner relationship, as evidenced by the inclusion criteria of a male partner. Other studies make no mention of the type of partner relationships and none of the included studies mention the possibility of LGBTQ2S relationships, therefore an assumption is made the studies primarily included female-male partnerships. The current review did not include outcomes specific to fathers or other genders of parenting partner, making an assumption that the data collection occurred with the birthing mother parent.

The scope of the review was purposefully broad to capture the many and various terms used to describe the population, intervention, and outcomes of interest. This resulted in generating a large number of studies targeted at two groups; prenatal education classes for the general population and prenatal education classes for women at risk for maternal mental health concerns. A decision was made to focus the current review on prenatal education classes for the general population as this is the typical course offered by health regions in Western Canada and to aid synthesis of the research to produce a meaningful review. The current review aimed to include areas and countries beyond Western Canada, as prenatal education does occur around the world. The included literature was from both English language dominant countries (n=6) and non-English language dominant countries (n=9), of western and non-western dominant perspectives, although all were from urban areas with modern health care, with most from high resource countries. Therefore, the current review is limited in its generalizability to the general population of birthing women in urban areas, with modern health care systems.

Second, there are limitations in the validity criteria used to rate study design. The current review includes studies which met both strong (RCT) and moderate ratings (matched cohort). Studies labeled on the validity tool as matched cohort design with no regression to control received moderate scores. While it is of value to include matched cohort design in public health interventions as discussed earlier, it must be recognized this form of research has the potential for

bias. Prenatal education classes are an intervention in which important findings may be missed by relying solely on RCTs, due to the difficulty in randomizing this population.

Third, an additional risk of bias is the attrition rate. The attrition rate was relaxed to include studies of up to 35% attrition. Five studies had an attrition rate of ≤ 15% and ten were 16-35%. The current systematic review is concerned with postpartum outcomes and a prenatal intervention; there is a necessary lag between the intervention and the measuring time point which may impact attrition rates. There is a benefit in including studies with less rigorous forms of randomization and attrition because the review may also be more representative of the real-world experience of prenatal attendance.

Fourth, there is a limitation of performance bias within the current review. Performance bias is the difference in the way the groups are treated or differences in their exposure of similar interventions other than the intervention in question (Higgins & Green, 2011). Most studies included in the current review were not double blinded and some were not single blinded and did not report this as a limitation, although two studies did make note of this consideration. Most studies included in the review did require participants not attend other prenatal education classes or noted if they did.

Fifth, there is heterogeneity in the included studies making comparisons difficult, particularity in the concepts under study, the measuring tools used, and the content of the interventions. Most of the tools utilized in the studies were well known, with reported validity and reliability, yet the sheer number of tools makes for difficulty in synthesizing the data. There are two main forms of intervention and control groups used for comparisons found in the review, which tend to provide differing results. The diversity of content and type of prenatal education classes among the studies did provide a challenge to synthesizing the results, yet this diversity reflects both the complexity of becoming a mother and the complexity in offering prenatal education to meet the needs of varying populations of mothers.

Sixth, the current review recognizes publication bias. The review did explore one university database of nonpublished research, finding no studies to include, therefore all the included studies are of published research. There is a bias due to the English language inclusion criteria which may limit the generalizability of the findings towards western high resource countries and countries in which research is being translated to English. The review did include eight studies from countries which are not English language dominated, although it was

determined three of the 10 studies lost to follow-up were due to non-English translation availability.

Lastly, it is possible that not all studies relevant to the review were located and so, the review is limited to the studies retrieved. To mitigate this as much as possible, the graduate student worked with an experienced health sciences librarian and sought support to conduct a rigorous search.

5.4 Dissemination of Findings

The results of this research will be prepared for dissemination to provide a mechanism for knowledge translation. The research will be disseminated to other researchers by publishing in a scholarly peer-reviewed journal focused on maternal infant health, nursing research or public health (e.g. Journal of Perinatal Education or Canadian Journal of Public Health), through the use of social media, and presenting the findings at a graduate seminar (e.g. NURS 990) and at an appropriate conference (e.g. Canadian Association of Perinatal and Women's Health Nurses). Opportunities will be sought to present the research findings to relevant health departments in Saskatchewan such as the SHA and Health Canada First Nations and Inuit Health Branch. As this research may be of interest to mothers, appropriate findings can be reported in ways to reach the public using consumer media such as news articles.

5.5 Conclusion

The current systematic review found a significant amount of literature on prenatal education classes related to maternal mental health, social support, and transition to motherhood, with limited literature on infant care and no literature on sexuality. The relevance tool was applied to 251 studies, with 15 meeting the revised relevance criteria and validity criteria for strong and moderate studies to be included in the review. The current systematic review is limited to the 15 studies which examined prenatal education classes for the general population. An examination of five broad psychosocial outcomes for prenatal education classes, found there is great heterogeneity in the tools used to measure these outcomes, as well as the concepts which are utilized to understand these outcomes. The results of the current review must be examined within the context of the challenges inherent in public health intervention research. Prenatal education class interventions do show some benefit to maternal mental health, social support, and transition to motherhood, although there are some aspects of these concepts which are not improved by attending prenatal education class interventions.

Due to the heterogeneity of the studies, it is difficult to come to a firm conclusion about the effectiveness of prenatal education. As maternal mental health, social support and transition to motherhood are correlated variables, an impact on one variable may influence the others. These outcomes are of importance in reducing the mental health burden in women and also potentially improve infant health. This research suggests prenatal education class interventions which include focused content on psychosocial topics and/or skill development and/or of longer duration as added sessions or incorporated throughout a series may demonstrate improvement in some areas of maternal mental health, social support, and transition to motherhood. The results of the current systematic review of RCT and matched cohort designs suggests, although there is sound evidence of the effectiveness of prenatal education classes for other outcomes, there is limited evidence of success for psychosocial outcomes with further research needed to address the limitations of the included studies. Those interventions which do demonstrate success are more likely to be of longer duration, include a skill component, or incorporate content specific to a psychosocial issue.

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Appendix A

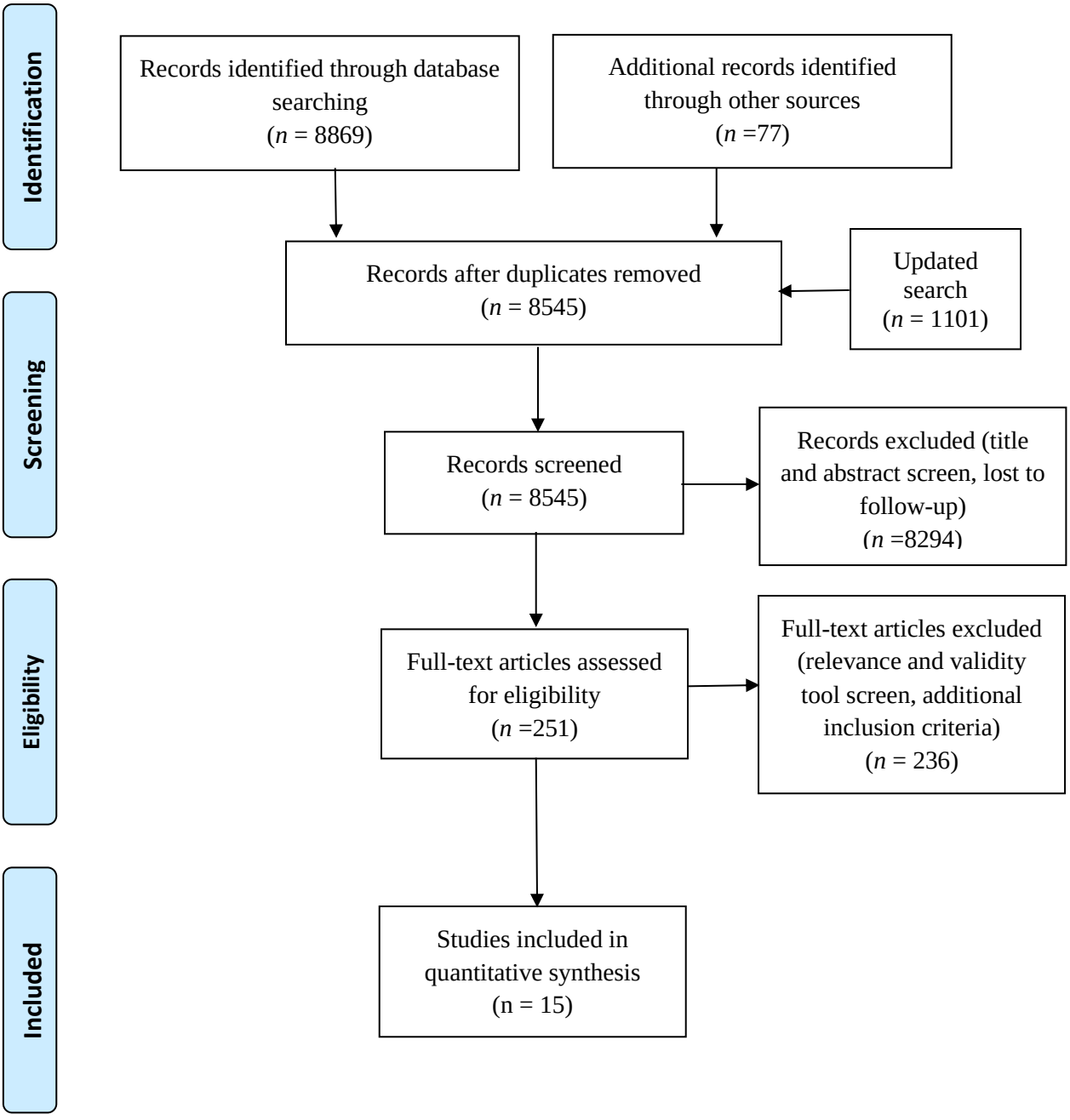

Figure A.1 PRISMA Flow Diagram

(adapted from Moher et al., 2009)

Appendix B

Relevance Tool

Study ID_____ Date _____
Reviewer _____

Instructions:
1. Circle Yes or No for each criterion
2. Record Yes or No for reviewer decision. Study must meet all criteria to be accepted.
3. Record on "Additional References' document if additional references to be retrieved.

Relevance criteria

1. Is the published or unpublished date 1998-2018	Y	N
2. Is the study written in English?	Y	N
3. Is the study evaluating a structured group class for pregnant women?	Y	N
4. Does >50% of the education take place during pregnancy?	Y	N
5. Is there a comparison study design?	Y	N
6. Does the study measure 1 or more or the following outcomes?		
Mental health	Y	N
Social support	Y	N
Infant care	Y	N
Transition to Motherhood	Y	N
Sexuality	Y	N
7. Are the outcomes measured 0-12 months after birth?	Y	N

Reviewer Decision

Include study in the systematic review? (Must answer yes to all criteria)	Y	N

Discrepancy in Inclusion Decision

Is there a discrepancy between reviewers in inclusion decision?		Y	N
Reason for discrepancy?	Oversight	Y	N
	Differences in interpretation of criteria	Y	N
	Differences in interpretation of study	Y	N

FINAL INCLUSION DECISION	**Y**	**N**

(adapted from Peacock, 2003)

Dictionary of Terms: Relevance Tool

Comparison group: A minimum of two groups with one being a control group

Mental health: Any measure of psychological well-being or distress

Social support: Any measure of social support or social relationships, including but not limited to partner/spouse, family members, friends, other parents.

Infant care: Any measure reflective of parenting such as mother-infant attachment, parenting knowledge, skills, competence, behaviour

Transition to motherhood: Any measure of transition, role or adaptation

Sexuality: Any measure of maternal sexuality or family planning

Structured group class: Group education of three or more pregnant participants, attended by a woman alone or with a support person. Structured education refers to a planned curriculum which provides information or has an educational or learning component, in relation to childbirth and/or the outcomes of maternal mental health, social support, infant care, transition to motherhood, or sexuality

Appendix C

Validity Tool

Study ID_____ Date_____

Reviewer_____

Instructions: Circle the answer which best describes the study

A) Design and Allocation to Intervention/Control Group

1.	Random	Pass
2.	Matched cohort	Moderate
3.	Pre-Post/non-random/unknown	Fail

B) Attrition

1.	≤15%	Pass
2.	16-35%	Moderate
4.	≥ 36% or not reported	Fail

C) Control for Confounders

1.	Controlled through design or analysis	Pass
2.	Repeated measures/matched cohort with no regression to control	Moderate
3.	No control for confounders (descriptive, pre-post)/unknown	Fail

D) Measures/Data Collection of Outcomes of Interest

a)	Well described/widely used	Y	N	U
b)	Pretested/widely used	Y	N	U
c)	Assessor blinded	Y	N	U

1.	2-3 yes answers	Pass
2.	1 yes answer	Moderate
3.	0 yes	Fail

E) Type of Statistical Analysis

1.	Bivariate/multivariate analysis	Pass
2.	Descriptive or other analysis	Moderate
3.	Unknown/none	Fail

F) Reporting of Outcomes of Interest

1.	Pre-determined or retrospective outcomes reported completely	Pass
3.	Some outcomes of interest are not reported/change in the intent	Moderate
4.	Not reported/incomplete reporting	Fail

Overall Rating (Circle the appropriate category)

3 or more fail	Poor
1-2 fail	Weak
0 fail and 2 or more moderate	Moderate
0 fail and 0-1 moderate	Strong

Agreement among reviewers **Y** **N**

(adapted from Peacock, 2003)

Validity Tool Dictionary

A) Design and Allocation to Intervention/Control Group

Random: Process of randomization is described. Includes random assignment of subjects to groups, blocked randomization, stratified random sampling

Matched Cohort: Non-random subject matched by similar characteristics. Includes non-random subjects in randomized sites

Pre-Post: pre-post 1 group design

B) Attrition

The percentage of study subjects remaining in the study at the final data collection point as reported by the authors.

$$\text{Attrition} = \frac{\text{number of subjects who withdraw/do not complete all measures}}{\text{sample size}} \times 100$$

C) Control for Confounders

Controlled through Design or Analysis:

- Demographic characteristic or other variables of specific importance to the study are measured (examples: age, education, income, risk of mental health issue, parity)
- Confounders are controlled through study design (RCT) whereby no differences between groups are expected to occur
- If differences are found between groups, statistical analysis (examples: stratification logistic regression, linear regression, ANCOVA, propensity score) is completed to control confounders.

Repeated measures/matched cohort with no regression to control: Non-random matched cohort and/or repeated measures with minimum two groups

No control for confounders: descriptive study and/or 1 group pre-post test

D) Measures/Data Collection of Outcomes of interest to the Systematic Review

Well Described and or Widely Used measure:

- A clear description of how the data was collected.
- A clear description of measures/tools related to maternal mental health, social support, infant care, transition to motherhood, or sexuality.
- Reliability and/or validity are addressed on the majority of the measures or the measuring tool is a widely known tool which is known to have had previous reporting on reliability and/or validity.
- Widely used tools include;
    - *BDI Beck Depression Inventory*
    - *CES-D/CES-D-R Center for Epidemiologic Studies for Depression-Revised*

- *DASS-21 Depression Anxiety Stress Scale*
- *EPDS Edinburgh Postnatal Depression Scale*
- *GHQ General health Questionnaire*
- *MAAS Mindful Attention Awareness Scale*
- *PANAS-X Positive negative Affect Scale- Extended*
- *PHQ Patient health Questionnaire*
- *PSEQ/PPSEQ Pregnancy Self Evaluation Questionnaire/ Postpartum Self Evaluation Questionnaire*
- *PSI Parenting Stress Index*
- *PSOC-E/-S Parenting Sense of Competence Scale-Efficacy/Satisfaction*
- *PSS Perceived Stress Scale*
- *PSSS Perceived Social Support Scale*
- *SPSQ (Swedish parenthood Stress Questionnaire*
- *STAI State Trait Anxiety Inventory*

Pretested/Widely Used Measures: Pilot study, or tool previously used in a similar population, including studies by different researcher

Blinded: The data collector is blinded to group when taking/analysing measures or the subject is blinded to group on self-report measures

E) Statistical Analysis of Outcomes of Interest to the Systematic Review

Multivariate analysis: more than 2 variables or 2 groups

Bivariate analysis: examines 2 groups on same variable or 1 group with 2 variables.

F) Outcome Reporting

Pre-determined or Retrospective outcomes reported completely: The outcomes are predetermined prior to the beginning of the study and are reported on fully, including all primary and secondary outcomes, or retrospective study (no predetermined outcomes) outcomes are reported on fully, including all primary and secondary outcomes

Some outcomes of interest are not reported/change in intent: Some outcomes are not reported, or the outcomes, measures or analysis reported appear to have changed from the intent of the research

Not reported/ incomplete reporting: a key outcome one would expect to be reported is not reported or not reported completely limiting ability to include results in a systematic review

Appendix D

Table D.1

Data Extraction Tool

Author Year Country Research design Attrition	Sample	Class data	Outcomes of interest	Considerations
Arcamone, 2005 USA Matched cohort (non-equivalent groups, confounders controlled by design) Attrition 21%	*N*= 200 baseline *N*= 158 finished *Interv. 1 n*= 52 *Interv. 2 n*= 53 *Control: n*= 53 *Age:* 18+ *Parity:* primip *Other criteria:* English, partner attended, normal vaginal birth with tear or episiotomy, healthy baby	*Type of class:* standard prenatal class *Group 1*: standard prenatal class and infant care class Length: prenatal class 4-2.5 hr classes or 1 day-8 hr or 2 day 4-hr; infant care class 1-2 hr class Total: 9-12 hrs *Group 2*: same prenatal class with no infant care class Length Total: 8-10 hrs *Control:* nonattenders *Intervention content:* Prenatal class: childbirth, coping, pain, PP issues Infant class: newborn characteristics, care, and coping *Setting:* 3 urban hospitals, 1 per group *Credentials:* not reported *Adherence:* not addressed	*Time:* 2 wks PP: (PPSEQ) *Scales:* 3 of 7 subscales in PPSEQ *MMH-Internal resources-confidence*: confidence in coping with the tasks of mother subscale *SS-Quality of relationships*: quality of relationship with husband subscale *TR-Satisfaction with motherhood and life*: satisfaction with motherhood and infant care subscale *Significant:* none *Nonsignificant:* *MMH-Internal resources-confidence*: Group 1 women had no difference in confidence, compared to Group 2 and control at 2 wks PP *SS-Quality of relationships:* Group 1 women had no difference in quality of relationship compared to Group 1 and control at 2 wks PP *TR-Satisfaction with motherhood and life*: Group 1 women had no difference in satisfaction with motherhood and infant care, as compared to Group 2 and control at 2 wks PP	No intention to treat analysis. Reported limitations: other exposure to knowledge not assessed, generalizability, geographic location, instructors may have utilized differing strategies for teaching and communication with the group.

Author Year Country Research design Attrition	Sample	Class data	Outcomes of interest	Considerations
Bahrami et al., 2013 Iran RCT Attrition: 0%	*N*= 160 baseline *N*=160 complete *Interv. n*= 80 *Control n*= 80 *Age:* 18-35 *Parity:* primip *Other criteria:* Farsi, 8 prenatal visits, 6 of 8 prenatal classes, no medical, psychiatric diseases, healthy weight, no drug use, pregnancy complications, congenital anomalies, low birth weight, or family difficulties, singleton, healthy baby, no family difficulties	*Type of class:* standard prenatal class. Length: 8-1.5 hour Total: 12 hrs *Control:* nonattenders *Intervention content:* physiological, psychosocial, nutrition changes in pregnancy, childbirth, and coping with childbirth, PP care, newborn care, breastfeeding, family planning; 1 counselling session to answer mothers' questions (not reported if group or individual) *Setting:* health centre *Credentials:* midwife *Adherence:* not reported	*Time:* Baseline: unclear 6-8 wks PP: WHOQOL-BREF 1 yr. PP: WHOQOL-BREF *Scales:* WHOQOL-BREF 2 of 4 subscales *MMH-Mental well-being:* psychological health *SS-Quality of relationships:* quality of social relationships *Significant:* *MMH-Mental well-being:* intervention group had significant increase in quality of psychological health compared to control at 6-8 wks PP (p=0.017) and at 1 yr. pp (p=0.002) *SS-Quality of relationships:* intervention group had significant improvement in quality of social relationship compared to control at 6-8 wks PP (p=0.01) *Nonsignificant:* *SS-Quality of relationships:* intervention group did not show a significant difference in quality of social relationship compared to control at 1 yr PP	100% response rate. No reported limitations. Unclear if exposure to other education or usual care. Stated "(intervention and control group) were reenrolled in the routine prenatal care classes" p 170 Bahrami et al. 2013.

Author Year Country Research design Attrition	Sample	Class data	Outcomes of interest	Considerations
Daley-McCoy et al., 2015 UK Matched cohort: (Cluster RCT, classes randomized, not individuals) Attrition: 35%	*N*=70 baseline *N*=46 complete *Interv.* n=26 *Control* n= 20 *Age:*18+ *Parity:* primip *Other criteria:* married or co-habitating, no pre-existing parenting experiences	*Type of class:* standard prenatal class + psycho-education approach on relationship functioning Length:5-2 hr classes + intervention of extra 1-2 hr session after class in week 5 Total: 12 hrs *Control:* standard NHS prenatal classes Length: 5-2hr classes *Intervention content*: realistic expectations of parenthood, effective communication skills *Setting:* urban hospital *Credentials:* standard class: midwife; intervention: clinical psychologist in training (primary researcher) *Adherence:* midwives assessed adherence of intervention session. Adherence ranged from 91.7-100%, average 98.2, indicating treatment fidelity	*Time:* Baseline: CSS, CCS, EDPS 6 wks PP: CSS, CCS, EDPS *Scales:* *MMH-Depression-symptoms:* EPDS *SS-Other concepts of social support:* CSS (satisfaction) and CCS (communication) *Significant:* *SS-Other concepts of social support:* intervention group had significantly less deterioration over time (baseline-6 wks PP) in relationship satisfaction compared to the control (*p*=0.021) (CSS) However, the p values in the narrative/abstract are not the same as those in table 4, this appears to be p=0.021 in narrative pg. 688 and p=0.018 in table 4, regardless, both are significant) *Nonsignificant:* *MMH-Depression-symptoms:* intervention group had no difference in psychological distress over time as compared to the control (EPDS) *SS-Other concepts of social support*: intervention group had no difference couple communication as compared to the control (CCS)	Intention to treat. Reported limitations: generalizability (high ed level and stable relationships), waves of data collection.
Duncan et al., 2017 USA RCT	*N*= 30 baseline *N*= 29 complete *Interv. n*= 15 *Control n*=14	*Type of class:* new design prenatal class with focus on mindfulness for labour pain and fear Length: weekend course	*Time:* Baseline: CED-S, FFMQ Post intervention during pregnancy: CED-S, FFMQ 6 wks PP: CES-D, FFMQ	With and without intention to treat, same results.

Author Year Country Research design Attrition	Sample	Class data	Outcomes of interest	Considerations
(stratified for pre-class intention of epidural use) pilot Attrition: 3%	*Age:* not reported *Parity:* primip *Other criteria:* English, no previous extensive experience of mediation or yoga, no attendance other prenatal classes, low risk pregnancy, healthy singleton, vaginal birth	Total: 18 hours *Control:* other standard childbirth education, provided list of preapproved courses of similar length and quality *Intervention content:* childbirth, mindfulness for coping in labour, pain and fear, practice mindful coping and personalized strategies, support *Setting:* university *Credentials:* certified mindfulness-based childbirth and parenting program instructors *Adherence:* not reported	*Scales:* *MMH-Depression-symptoms:* CES-D *MMH-Internal resources-other internal resources:* FFMQ *Significant-* *MMH-Depression-symptoms*: intervention group had a significant decrease in depression symptoms across time (baseline, postintervention, prenatal, 6 wks PP) as compared to control. (p=0.04) (CES-D) *Nonsignificant* *MMH-Internal resource-other internal resources*: intervention group had no difference in mindfulness between groups over time (baseline, postintervention/prenatal, 6 wks PP) (FFMQ)	Reported limitations: small pilot under power.
Gao et al., 2010 China RCT Attrition: 10%	*N*= 194 baseline *N*= 175 complete *Interv.* n= 87 *Control* n= 88 *Age:* <35 *Parity:* primip *Other criteria:* married,	*Type of class:* standard prenatal classes + interpersonal-psychotherapy approach to education Length: 2-90-minute standard classes, 20-minute break, then additional 90 minutes- 2 hours of intervention class Total: 6 hrs *Control:* standard prenatal class Length: 2-90 minutes classes	*Time:* Baseline: EPDS, GHQ, SWIRS 6 wks PP: EPDS, GHQ. SWIRS *Scales:* *MMH-Depression-symptoms:* EDPS *MMH-Mental well-being*: GHQ *SS-Other concepts of social support:* "satisfaction with interpersonal relationships" SWIRS *Significant Findings:* *MMH-Depression-symptoms:* intervention group	Intention to treat. Reported limitations: generalizability. Discrepancy in length of intervention: Gao 2010,

Author Year Country Research design Attrition	Sample	Class data	Outcomes of interest	Considerations
	normal pregnancy, 28 wks+ gestation, no history of psychiatric disorders	Total: 3 hrs *Intervention content:* standard class plus Session 1: transition to motherhood, communication and skills, baby gender, PPD Session 2: social support, interpersonal conflict and resolution skills, issues for Chinese PP traditional 1 month, utilized specific ITP techniques, with 1 f/up phone call within 2 weeks post birth *Setting:* urban teaching hospital *Credentials:* midwives for routine class, midwife with intensive training and supervision in interpersonal psychotherapy (first author) for second session *Adherence:* not reported	had a decrease in depressive symptoms at 6 wks (p=0.000) (EPDS) intervention group had a significant decrease in depressive symptoms across time (baseline-6 wks) as compared to control (0.000) (EPDS) *MMH-Mental well-being:* intervention group had improved psychological well-being at 6 wks (p=0.001) (GHQ) intervention group had improved psychological well-being across time (baseline-6 wks) as compared to control (p=0.000) (GHQ) *SS-Other concepts of social support:* intervention group had improved satisfaction in interpersonal relationships at 6 wks PP (p= 0.001) as compared to control (SWIRS) *Nonsignificant*: *SS-Other concepts of social support:* while the intervention group did demonstrate improved satisfaction in interpersonal relationships at 6 wks PP, there was no significant difference between groups over time (baseline-6 wks PP) (SWIRS)	two-90-minute sessions Gao 2012 two-2-hour sessions.
Gao et al., 2012 China RCT Attrition: 28%	*N*= 194 baseline *N*= 142 complete *Interv*. n=74 *Control* n=68	*Type of class:* standard prenatal classes + interpersonal-psychotherapy approach to education	*Time:* Baseline: EPDS, GHQ, PSSS, PSOC-E 6 wks PP: EPDS, GHQ, PSSS, PSOC-E 3 mo PP: EPDS, GHQ, PSSS, PSOC-E	Intention to treat. Reported limitations:

Author Year Country Research design Attrition	Sample	Class data	Outcomes of interest	Considerations
	Age: <35 *Parity:* primip *Other criteria:* Married, normal pregnancy, 28 wks+ gestation, no history of psychiatric disorders	Length: 2-90-minute standard classes, 20-minute break, then additional 90 minutes of intervention class Total: 6 hrs *Control:* standard prenatal class Length: 2-90 minutes classes Total: 3 hrs *Intervention content:* standard class (labour, baby care), plus Session 1: transition to motherhood, communication and skills, baby gender, PPD Session 2: social support, interpersonal conflict and resolution skills, issues for Chinese PP traditional 1 month. utilized specific ITP techniques, with 1 f/up phone call within 2 weeks post birth *Setting:* urban teaching hospital *Credentials:* midwives for routine class, midwife with intensive training and supervision in interpersonal psychotherapy (first author) for second session *Adherence:* not reported	*Scales:* *MMH-Depression-symptoms*: EDPS *MMH-Mental well-being*: GHQ *SS-Other concepts of social support*: perceived social support scale *TR-Self-efficacy*: PSOC-E *Significant:* *MMH-Depression-symptoms:* intervention group had decreased depressive symptoms at 3 mo PP (p=0.018) (EPDS) Intervention group had decreased depressive symptoms across time (baseline-6 wks PP-3 mo PP) as compared to control (p<0.01) (EDPS) *MMH-Mental well-being*: intervention group had significantly improved psychological well-being across time (baseline-6 wks PP-3 mo PP) as compared to control (p<0.01) (GHQ) *SS-Other concepts of social support*: intervention group had improved perceived social support at 3 mo PP (p=0.021) (Perceived social support scale) intervention group had improved perceived social support across time (baseline-6 wks PP-3 mo PP) as compared to control (p<0.01) (Perceived social support scale)e *TR-Self-Efficacy*: intervention group had improved maternal role competence at 3 mo PP (p=0.016) (PSOC-E)	generalizability. Discrepancy in length of intervention: Gao 2010, two-90-minute sessions Gao 2012 two-2-hour sessions.

Author Year Country Research design Attrition	Sample	Class data	Outcomes of interest	Considerations
			intervention group had improved maternal role competence across time (baseline-6 wks PP-3 mo PP) as compared to control ($p<0.01$) (PSOC-E) *Nonsignificant*: none	
Koushede et al., 2017 Denmark RCT (stratified for parity and vulnerability of psychosocial issues) Attrition: 24%	*N*=1766 baseline *N*= 1348 complete *Interv. n*=662 *Control n*=686 *Age:*18+ *Parity:* 85% primips, added multips due to low enrolment *Other criteria:* Danish, singleton	*Type of class:* small group prenatal classes 6-8 women Length: 3-2.5 hr + 1 class 5 wks PP Total: 7.5 hrs *Control:* standard large prenatal classes of 250 people. Length: 2-2 hr lectures on birth and breastfeeding Total: 4 hours *Intervention content:* topics: transition, communication, birth, breastfeeding, newborn care with focus on psychosocial aspects and parenting resources for SS, parenting alliance, cognitive coping, parenting skills aim to strengthen relationships and problem solving skills; patient network website to supplement classes *Setting:* 3 midwifery clinics *Credentials:* prenatal- midwife (25); postnatal-health visitor (6).	*Time:* Baseline: PSS, mental health questions and EPDS 37 weeks gestation: PSS 9 wks PP: EPDS PSS, SPSQ, 6 mo PP: PSS, SPSQ, PAM *Scales:* *MMH-Depression symptoms: EPDS* *MMH-Other mental health concerns:* PSS, SPSQ *SS-Other concepts of social support:* PAM *Significant:* *MMH-Other mental health concerns:* while the intervention group has a statistically significant difference in perceived stress at 6 mo PP it is a slight difference. (*p*=0.04) (PSS) while the intervention group demonstrated a slight statistical difference in perceived stress over time (37 weeks gestation, 9 wks PP and 6 mo postpartum), it is not a clinically relevant difference (*p*=0.02) *Nonsignificant:* *MMH-Depression-symptoms:* intervention group had no difference in depressive symptoms at 9 wks PP (EPDS)	With and without intention to treat, same results. Reported limitations: measures to 6 mo only, generalizabilit y: small number of multips, high ed level. None of the across time measures include baseline. Subjects were allowed to take concomitant courses, data

Author Year Country Research design Attrition	Sample	Class data	Outcomes of interest	Considerations
		All had 1-day training workshop and detailed guide *Adherence:* not reported	*MMH-Other mental health concerns:* intervention group had no difference in perceived stress 9 wks PP. (PSS) intervention group had no difference in parenting stress between groups at 9 wks or 6 mo PP. (SPSQ) intervention group had no difference in parenting stress across time (9 wks PP-6 mo PP) as compared to control. (SPSQ) *SS- Other concepts of social support:* intervention group had no difference in parenting alliance at 6 mo. (PAM)	collected on this.
Maimburg & Væth, 2015 Denmark RCT Attrition: 10%	*N*= 1193 baseline *N*= 1069 complete *Interv. n*=543 *Control n*=526 *Age:* 18+ *Parity:* primip *Other criteria:* Danish, singleton	*Type of Class*: standard prenatal class Length:3-3hr classes Total: 9 hrs *Control:* usual prenatal care, no prenatal classes were offered at this location *Intervention content:* birth class; newborn class: care, breastfeeding, disease/vaccine, safety; parenthood class: transition, mat leave, sex, conflicts, role of grandparents, friends, PP.	*Time:* Baseline: demographics 6 wks: EPDS *Scales:* *MMH-Depressions-symptoms:* EDPS *Significant:* none *Nonsignificant*: *MMH-Depression-symptoms:* the odds of PPD the same for the intervention and control groups (OR=0.89, CI 95% 0.57-1.40)	Intention to Treat. Reported limitations: low EPDS scores, no PP sessions, and no diagnostic follow-up, low number of low-income women, generalizability.

Author Year Country Research design Attrition	Sample	Class data	Outcomes of interest	Considerations
		Setting: recruited from 1 clinic associated with 1 hospital, no further detail on setting *Credentials:* midwives *Adherence:* not reported		Some intervention women may have taken private lessons which did not include any postnatal info Controls: not reported if took other classes.
Mao et al., 2012 China RCT Attrition: 8%	*N*= 240 baseline *N*= 221 complete *Interv. n*= 113 *Control n*= 108 *Age:* excluded puerperal of old age, undefined *Parity:* primip *Other criteria:* healthy mother, no history psychiatric illness, normal pelvis size, cephalic presentation,	*Type of Class:* new design of prenatal classes with focus on emotional self-management training Length: 4-90-minute group sessions + 1 individual counselling Total: 6 hrs *Control:* Standard prenatal classes Length: 4-90 minutes classes from OB nurses *Intervention Content:* self-management and Chinese delivery culture, problem solving and positive communication, relaxation exercises and cognitive	*Time:* Baseline: PHQ-9 Post intervention/Prenatal: PHQ-9 6 wks PP: EPDS, if score ≥ 11 SCID diagnostic tool *Scales:* *MMH-Depression-symptoms:* EPDS *MMH-Depression-diagnosis*: SCID—I/P *Significant:* *MMH-Depression-symptoms:* intervention group had lower depression symptoms at 6 wks PP (*p*= 0.04). (EPDS) *MMH-Depression-diagnosis*: intervention group were less likely to have PPD diagnosis at 6 wk follow-up ($p < 0.05$). (SCID-IP) *Nonsignificant:* none	Intention to treat. Reported limitations: one location, did not target high risk women, all primips, generalizabilit y.

Author Year Country Research design Attrition	Sample	Class data	Outcomes of interest	Considerations
	singleton	restructuring, self-confidence; each class had homework; one individual counselling session *Setting:* recruited from a hospital, no detail *Credentials:* second author, obstetrician with intensive training in the program *Adherence:* not reported		
Matthey et al., 2004 Australia Matched cohort (RCT: classes randomized, not individuals) Attrition: 33%	*N*=268 baseline *N*= 202 6 wks *N*= 180 6 mo 6 wks *Interv*. n=75 *Control 1 n*= 64 *Control 2 n*=84 6 mo *Interv*. n=66 *Control 1 n*= 59 *Control 2 n*=74 *Age:* not reported *Parity:* primip *Other criteria:* English, have a	*Type of Class:* standard prenatal classes + 1 extra session on psychosocial issues and empathy Length: 6-2hr classes + extra intervention session in week 5 unknown length Total: 12+? hrs *Control 1:* standard prenatal classes + non-specific control of 1 extra session on infant development and play and 1 prenatal and 1 postnatal mailout regarding play. Length: 6-2hr classes + extra session in week 5 unknown length Total: 12+? hrs *Control 2*: standard prenatal classes + 15 minutes on	*Time:* Baseline: CSEI, EDPS, POMS, SOS 6 wks PP: EPDS, POMS, SOS, PSOC-K, WDW, partner awareness scale, structured diagnostic interview 6 mo PP: EPDS, POMS, SOS, PSOC-K, WDW, structured diagnostic interview *Scales:* *CSEI used at baseline to place into low medium high groups* *MMH-Depression-symptoms*: EPDS, *MMH-Depression-symptoms*: EPDS cut-off score; structured diagnostic interview for depression diagnosis *MMH-Other mental health concerns*: distress/mood (POMS) *SS-Instrumental:* WDW *SS-Support from others*: SOS *TR-Self-efficacy*: parenting competence, PSOC-E *Significant:*	With and without intention to treat with different results self-efficacy on one measure. No reported limitations.

Author Year Country Research design Attrition	Sample	Class data	Outcomes of interest	Considerations
	partner, healthy baby	postnatal depression and local services for depression Length: 6-2 hr classes +15 minutes Total: 12.15 hrs *Intervention content:* standard prenatal class plus intervention in week 5: empathy in the couple relationship; couples understanding of each other, ID behaviours, strategies for stress, normalize stress in PP period. 1 prenatal and 1 postnatal mailout re: similar topics *Setting:* recruited from an evening program at a hospital *Credentials*: standard class: standard parent educators and physiotherapists. Intervention and baby play: first author, male clinical psychologist and a female SW or OT with experience in counselling *Adherence:* not reported	*MMH-Depression-symptoms:* intervention group (low self-esteem) had fewer depressive symptoms at 6 wks PP than baby play control (p<0.01) and TAU control (p<0.01) (EPDS). *SS-Instrumental:* intervention group (low self-esteem) significantly more satisfied with sharing home and baby tasks than either control (p<0.05) (WDW) at 6 wks *TR-Self-efficacy*: intervention group (low self-esteem) had significantly higher parenting sense of competence than baby play control (p<0.05) and TAU control (p<0.01). (PSOC), but not when intention to treat used *Nonsignificant:* *MMH-Depression-symptoms*: intervention group (low, medium, high self-esteem, and total) no significant difference in depressive symptoms (EPDS) between any of the 3 conditions (intervention, baby play control, TAU control) at 6 wks PP intervention group (low self-esteem) no significant difference in depressive symptoms (EPDS) between the two controls groups: baby play control and TAU control at 6 wks intervention group (low, medium, high self-esteem) no significant difference in depressive symptoms (EPDS) between any of the 3 conditions	

Author Year Country Research design Attrition	Sample	Class data	Outcomes of interest	Considerations
			(intervention, baby play control, TAU control) at 6 mo. PP *MMH-Depression-diagnosis:* EPDS cut off categories show no significant difference in cut-off between groups at 6 wks no significant difference in depression or depression-anxiety diagnosis between the conditions at 6 wks or 6 mo. regardless of self-esteem level *MMH-Other mental health concern:* intervention (low, medium, high self-esteem) no significant difference on measures of distress between any of the 3 conditions (intervention, baby play control, TAU control) at 6 wks and 6 mo. PP *SS- Instrumental:* intervention (medium, high, self-esteem or total) no significant difference on satisfaction with sharing home and baby tasks at 6 wks (WDW) intervention group (low, medium, high self-esteem, or total) no significant difference on satisfaction with sharing home and baby tasks at 6 mo (WDW). *SS-Support from others:* intervention group (low, medium, high, self-esteem, or total) no significant difference in support from others at 6 wks or 6 mo. PP (SOS)	

Author Year Country Research design Attrition	Sample	Class data	Outcomes of interest	Considerations
			TR-Self-efficacy: intervention (medium, high self-esteem, or total) no significant difference on parenting sense of competence at 6 wks (PSOC) intervention (low, medium, high self-esteem, or total) no significant difference on parenting sense of competence at 6 mo. PP (PSOC)	
Ngai et al., 2009 Hong Kong Matched cohort (quasi-experimental: sites randomized) Attrition: 33%	*N*=184 baseline *N*= 123 complete *Interv. n*=79 *Control n=44* *Age:* 18+ *Parity:* primip *Other criteria:* Chinese, married, normal pregnancy, no history psychiatric illness, singleton	*Type of class:* standard prenatal class + added psychoeducational approach Length: routine 6-2hr classes plus 3-1 hr sessions added to 3 of the routine classes Total: 15 hrs *Control:* standard prenatal classes Length: 6-2hr classes Total: 12 hrs *Intervention content:* addition of learned resourcefulness training added to the end of the class. Session 1: stress/emotional change in perinatal period, coping skills for parents. Session 2: cognitive restructuring skills for irrational thoughts. strengths approach. Session 3: problem solving strategies and decision making for childcare and newborn care.	*Time:* Baseline: SCS, EPDS, PSOC-E, SRRS, MO-SSS Post intervention/Prenatal: SCS, EPDS, PSOC-E, 6 wks PP: SCS, EPDS, PSOC-E 6 mo PP: SCS, EPDS, PSOC-E, *Scales:* *MO-SSS and SRRS are at baseline only for covariates* *MMH-Depression*: EPDS *MMH-Internal resources:* SCS *TR-Self-efficacy:* maternal role competence PSOC-E *Significant:* *MMH-Depression-symptoms:* intervention group had fewer depressive symptoms over time (baseline-post-6 wks PP-6 mo PP) as compared to control (p=0.01) (EPDS) *MMH-Internal resources:* intervention group had positive difference in learned resourcefulness across	Intention to Treat. Reported limitations: not random, generalizabilit y Hawthorne effect (extra contact with researcher). Significant differences at baseline (age, education, income, gestation, social support). Correlations examined, finding age and social

Author Year Country Research design Attrition	Sample	Class data	Outcomes of interest	Considerations
		goal setting, integrate and practice learned resourcefulness skills for stress *Setting:* 2 regional hospitals, one control, one intervention *Credentials:* First researcher, experienced midwife and childbirth educator with formal training on cognitive restricting *Adherence:* not reported	time (baseline-post- 6 wks PP-6 mo PP) as compared to control (p=0.004) (SCS). *Nonsignificant:* *TR-Self-efficacy:* intervention group had no difference in maternal role competence over time (baseline-post- 6 wks PP-6 mo PP) (PSOC-E).	support necessary covariates.
Schachman et al., 2004 USA RCT Attrition: 18%	*N*= 111 baseline *N*= 91 complete *Interv. n*= 44 *Control n*= 47 *Age:*18+ *Parity:* Primip *Other Criteria:* English, wives of active military member, no medical risk factors	*Type of Class:* standard prenatal class + internal and external resources for military mothers Length: 4-3hr classes plus 1 extra hour/class for additional content Total: 16 hours *Control:* standard prenatal classes Length: 4-3 hr classes Total: 12 hours *Intervention Content:* standard prenatal class plus BBC intervention standard class: prenatal health, childbirth and coping, newborn care. Intervention: ID, development and use of internal and external	*Time:* Baseline: PSEQ, RS, PRQ-85 Post intervention/Prenatal: PSEQ, RS, PRQ-85 (irrelevant) 6 wks PP: PPSEQ, RS, PRQ-85 *Scales:* *MMH-Internal resources-confidence:* confidence in coping with the tasks of motherhood subscale *MMH-Internal resources-other internal resources:* internal resources via resiliency (RS) *SS-Quality of relationships*: quality of relationship with husband subscale *SS-Instrumental*: mother's perception of husband participation subscale *SS-Support from others*: support for maternal role from family/friend's subscale	No intention to treat. Reported limitations: longer contact time with the researcher, states no significant difference between demographics, but concern that this still influenced study, contagion effect (small community).

Author Year Country Research design Attrition	Sample	Class data	Outcomes of interest	Considerations
		resources for military wives. Includes use of internal resources for military life can also be used as internal resources to cope with motherhood. Includes reflection, positive feedback, confidence, self-esteem. External strategies local resources, communication techniques, friend support *Setting:* air force base hospital clinic *Credentials:* not reported *Adherence:* not reported	*SS-Other concepts of social support*: external support via perceived social support scale (PRQ-85) *TR-Satisfaction with motherhood and with life:* identification with motherhood role via satisfaction with life situation and circumstance subscale; satisfaction with motherhood and infant care subscale *Significant:* *MMH-Internal resources-confidence:* intervention improved confidence with motherhood *p*=0.17 (PPSEQ subscale) *SS-Support from others:* intervention increased support for the maternal role from family and friends *p*= 0.015 (PPSEQ subscale) *TR-Satisfaction with motherhood and with life:* intervention increased satisfaction with motherhood and infant care at 6 wks PP *p*= 0.034 (PPSEQ subscale) *Nonsignificant:* *MMH-Internal resources-other internal resources:* intervention had no difference on internal resources at 6 wks PP (RS) *SS-Quality of relationships*: intervention had no difference on quality of relationship with husband (PPSEQ subscale)	

Author Year Country Research design Attrition	Sample	Class data	Outcomes of interest	Considerations
			SS-Instrumental: intervention had no difference in perception of husband participation at six weeks postpartum (PPSEQ subscale) *SS-Other concepts in social support:* intervention made no difference in external resources/perceived support compared to control at 6 wks PP (PRQ-85) *TR-Satisfaction with motherhood and with life:* intervention had no difference on satisfaction with life circumstances and situation. (PPSEQ subscale)	
Serçekuş & Mete, 2010 Turkey Matched cohort (non-random, groups had equivalent characteristic) Attrition: 20%	*N*= 147 baseline *N*=118 complete *Interv. 1 n*= 40 *Interv. 2 n*=40 *Control n*= 38 *Age:* not reported *Parity:* primip *Other criteria:* Live with husband, subject's mother is living, completed primary school no attendance at another prenatal	*Type of class:* standard prenatal class Group 1: prenatal class Length: 7-2 hr classes Total: 14 hrs Group 2: prenatal education individual format Length: 5-120-minute sessions, Total:10 hrs (not relevant to this review) *Control:* routine prenatal care at a clinic, no education classes are offered in this community *Intervention content* Group 1: group classes: conception, nutrition, common complaints and relief, tests, exercise, childbirth and coping	*Time:* Baseline: PSEQ Post intervention/prenatal: PSEQ 6 wks PP: PPSEQ *Scales:* *6/7 subscales of the PPSEQ* *MMH-Internal resources-confidence:* confidence in coping with the tasks of motherhood subscale *SS-Quality of relationships*: quality of relationship with husband subscale *SS-Instrumental*: mother's perception of husband participation subscale *SS-Support from others*: support for maternal role from family/friend's subscale *TR-Satisfaction with motherhood and with life:* identification with motherhood role via satisfaction	No intention to treat. Limitations: not randomized, self-report.

Author Year Country Research design Attrition	Sample	Class data	Outcomes of interest	Considerations
	class, low risk pregnancy, full term birth, healthy baby, no PP complications	with pain/relaxation, physical and emotional changes PP, breastfeeding, family social support, return to work, infant care Group 2: same content in an individual format *Setting:* urban university, *Credentials:* first author, has completed 2 childbirth education courses and experienced CB educator, RN *Adherence:* not reported	with life situation and circumstance subscale; satisfaction with motherhood and infant care subscale *Significant:* none *Nonsignificant:* *MMH-Internal resources-confidence:* intervention did not change confidence in coping with motherhood and infant care at 6 wks PP *SS-Quality of relationships*: intervention did not change quality of relationship with husband at 6 wks PP *SS-Instrumental*: intervention did not change perception of husband participation at six wks PP *SS-Support from others*: intervention did not change support for maternal role from family/friends at 6 wks PP *TR-Satisfaction with motherhood and with life:* intervention did not change satisfaction with life situation and circumstance at 6 wks PP intervention did not change satisfaction with motherhood and infant care at 6 wks PP	
Serçekuş & Başkale, 2016 Turkey	*N*=72 baseline *N*=55 complete *Interv. n*= 28	*Type of class*: standard prenatal class Length: 8-2 hr	*Time:* 4 mo PP: MAI	No intention to treat.

Author Year Country Research design Attrition	Sample	Class data	Outcomes of interest	Considerations
Matched cohort (non-random, groups had equivalent characteristics) Attrition: 24%	*Control n*= 27 *Age:* not reported *Parity:* primip *Other criteria:* married, completed primary school, no attendance at another prenatal class, full term birth, healthy infant, no PP physical or psychiatric complications	Total: 16 hrs *Control:* usual prenatal care at a clinic *Intervention content:* nutrition, physiological and psychological changes in preg and PP, childbirth and coping, breastfeeding, parenting, newborn care, mother and father -infant interaction *Setting: not reported* *Credentials:* not reported *Adherence:* not reported	*Scales:* *INF*: mother-infant attachment (MAI) *Significant:* none *Nonsignificant:* *INF:* intervention had no difference on maternal infant attachment at 4 mo PP	Reported limitations: non- random sample, self-report.
Svensson et al., 2009 Australia RCT Attrition: 31%	*N*= 248 baseline *N*= 170 complete *Interv. n*=91 *Control n*=79 *Age:* not reported *Parity:* primip *Other criteria:* English	*Type of class:* new design prenatal class with increased parenting content Length: 7 -2hr classes + reunion class Total: 14-16hrs *Control:* standard prenatal class Length: 7 -2hr classes + reunion class Total: 14-16hrs *Intervention content:* standard	*Time:* Baseline: PES, CWS, 8 wks PP: PES, CWS *Scales:* *MMH-Other mental health concerns*: CWS (worry) *TR-Self-efficacy:* perceived parenting self-efficacy Postnatal parent expectations survey (PES) *Significant:* *TR-Self-efficacy:* intervention increased perceived parenting self-efficacy at 8 wks PP (PES*)* ($p<0.001$)	Intention to treat. No reported limitations.

Author Year Country Research design Attrition	Sample	Class data	Outcomes of interest	Considerations
		prenatal class plus: considered preg, labour and early parenting as the childbirth experience, parenting activities throughout course, guest new parents, bath demo of real newborn, problem solving approach *Setting:* 2 different locations within same hospital *Credentials:* all educators attended Basic Group skills training then randomly assigned to control or experimental courses. *Adherence:* not reported	*Nonsignificant:* *MMH- Other mental health concerns:* intervention had no difference on worry at 8 wks PP (CWS)	